**Before the
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Washington, D.C.**

In the Matter of	)
	)
	) **Docket No. 2001-8 CARP CD 98-99**
Distribution of the 1998 and 1999	)
Cable Royalty Funds	)
	)

REBUTTAL CASE

OF THE

JOINT SPORTS CLAIMANTS

Volume 3 of 3

(Incorporated Testimony)

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July 25, 2003
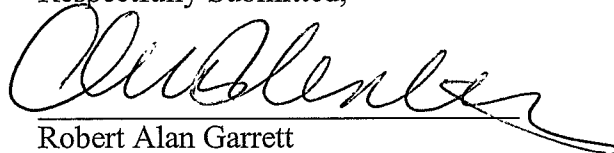
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In the Matter of)	
)	
DISTRIBUTION OF THE 1998 AND 1999)	Docket No. 2001-8 CARP CD 98-99
CABLE ROYALTY FUNDS)	

DESIGNATION OF TESTIMONY PURSUANT TO MAY 7 ORDER

Pursuant to the Copyright Arbitration Royalty Panel's (the "Panel") May 7, 2003 Order, Joint Sports Claimants ("JSC") hereby submit a list of testimony designated to be included in the record of this proceeding in response to the testimony filed by one or more of the other parties on June 20, 2003. These designations are intended to be in addition to the JSC's prior designations of testimony (included in Volumes 2-6 of the JSC's Direct Case and Volume 2 of the JSC's Rebuttal Case). Copies of the designated testimony are attached at Tabs 20-30 hereto.

Respectfully Submitted,

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DISTRIBUTION OF THE 1998 AND 1999	) **Docket No. 2001-8 CARP CD 98-99**
CABLE ROYALTY FUNDS	)
	)

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<u>PHASE 1 -- 1983</u>

<u>TESTIMONY OF ALLEN R. COOPER</u>

<u>VICE PRESIDENT, TECHNOLOGY EVALUATION AND PLANNING</u>

<u>MOTION PICTURE ASSOCIATION OF AMERICA</u>

This testimony is presented in behalf of the 78 producers
and syndicators of non-network series, specials and feature films
licensed to U.S. television stations and retransmitted as distant
signals by cable system. Exhibit _____ (ARC-1) is a listing of
these producers and syndicators, each of whom has filed a timely
claim for a share of cable copyright royalties for calendar year
1983, and has voluntarily agreed to representation by MPAA before
this Tribunal. A copy of the Agreement form executed by "Program
Suppliers" is submitted as Exhibit _____ (ARC-2).

Since the 1979 proceeding, MPAA has commissioned the A.C.
Nielsen Company to provide, on an annual basis, statistical data
relating to the viewing of all non-network programs as distant
signals in cable households. These "special studies" have been
assessed by the Tribunal as "the single most important piece of
evidence in this record. We have concluded that this study does
have probative value in establishing the entitlement of claimants
in accordance with some but not all of the criteria." (Notice of
Final Determination Concerning Distribution of the 1979 Cable
Royalty Fund.)

The balance of my testimony will focus on the findings of
the Special Nielsen Study - 1983.

1. Exhibit _____ (ARC-4) is a six-page summary of the
Nielsen data on station by station basis for all periods
encompassed in the study. The first page of this Exhibit
shows that the viewership of all non-network programs
broadcast by the 117 stations during the measurement periods,
via distant signals in cable households, totalled over 2.9
billion viewing hours. Of this total, the 45 commercial
independents accounted for 91.2% of the household viewing
hours; the 56 commercial network-affiliated stations were
credited with 6.2%; and the 16 non-commercial stations
affiliated with the Public Broadcasting Service for 2.6%.

It should be noted that these totals include all programs
broadcast by three commercial independent "specialty"
stations -- KMEX, Los Angeles; WNJU, Newark-New York; and
WXTV, Paterson-New York -- which broadcast primarily Spanish-
language programs, and the 16 non-commercial stations.
Because the reference sources used to categorize programs by
principal claimant groups generally exclude such programs, we
decided to forego categorization.

With respect to the non-network programs broadcast by all other stations, each program was categorized into one of six groups: Local; Syndicated Series; Non-Network Movies; Non-Network Major Sports; Non-Network Minor Sports; and Devotional Series. (These categories are defined on pages A-38 and A-39 of Exhibit _____ (ARC-3).) Exhibit _____ (ARC-4) shows for each of the 98 commercial stations (excluding the 3 Independent-Specialty and 16 PBS stations), the number of household viewing hours and the percentage of each station's total distributed among these categories. (Note: Syndicated Series and Non-Network Movies have been combined as a single category.)

"Local Programs", primarily local news and public affairs, accounted for only 2.9% of the total viewing hours on the 42 independents, 29.1% of the total accounted for by the 56 network affiliates, and 4.5% of the distant signal viewing on all 98 stations.

By far, the viewing of "Syndicated Series and Movies" via distant signals in cable households was the dominant category. 83.1% of the 2.8 billion hours was attributed to this category, which accounted for 85% of the total hours of independent station viewing and 55.2% of the total on the network affiliates.

In combination, "Major Sports" and "Minor Sports" accounted for over 11.5% of the 2.8 billion hours total.

Exhibit _____ (ARC-11) provides strong evidence with respect to the relative value of each category of programming to cable system operators and their subscribers. Based on the Nielsen data for the 32 "3.75% Stations" in the sample, it shows that viewing of "Syndicated Series and Movies" accounts for approximately 81% of the viewing of all non-network programs transmitted by these stations and "Sports" for over 14%, or a combined share of 95%. Viewing of "Local" programs attracted less than 4% of the viewing, and "Devotional" programming about 8-10ths of 1%.

SUMMARY

DISTANT SIGNAL VIEWING HOURS IN CABLE HOUSEHOLDS

SOURCE: Special Nielsen Study, 1983 — All (16 - 24) Weeks

	TOTAL VIEWING HOURS		"LOCAL" PROGRAMS		SYNDICATED SERIES & MOVIES		"MAJOR" SPORTS		"MINOR" SPORTS		DEVOTIONAL	
	# (000)	%	HOURS (000)	%	HOURS (000)	%	HOURS (000)	%	HOURS (000)	%	HOURS (000)	%
NON-NETWORK PROGRAMS												
Independents (Except Hispanic) (42 Stations)	2,649,106.0	90.473	75,797.8	2.861	2,251,272.3	84.982	269,697.6	10.181	54,063.9	2.041	17,543.6	.622
Network Affiliates (56 Stations)	181,274.6	6.191	52,830.3	29.144	99,990.5	55.160	1,892.4	1.044	552.3	.305	1278.1	.705
SUB-TOTAL	2,830,380.6	96.664	128,628.1	4.545	2,351,262.8	83.072	271,590.0	9.596	54,616.2	1.930	18,821.7	.665
ALL PROGRAMS												
Independents (Hispanic) (3 Stations)	20,969.6	.716										
Non-Commercial (16 Stations)	76,708.1	2.620										
SUB-TOTAL	97,677.7	3.336										
TOTAL — 117 STATIONS	2,928,058.3	100.000										

TELEVISION STATIONS RETRANSMITTED AT 3.75% RATE, JULY - DECEMBER 1983

INDEPENDENTS (25)	# OF SYSTEMS	ROYALTIES PAID (AT 3.75%)	PERCENT OF STATION TOTAL VIEWING HOURS (NON-NETWORK PROGRAMS)				
			"LOCAL"	SYND. SERIES & MOVIES	MAJOR SPORTS	MINOR SPORTS	DEVOTIONAL
CHCH Hamilton, Ontario	1	11,184					
CKWS Kingston, Ontario	1	15,267					
KBHK San Francisco *	1	8,662	0.69	94.92	3.93	---	---
KMSP Minneapolis-St. Paul *	1	8,207	4.55	85.32	6.68	3.19	0.26
KOKI Tulsa	1	8,261					
KSAF Santa Fe	1	108,189					
KTTV Los Angeles *	1	14,369	5.00	88.05	5.81	0.17	0.96
KTXH Houston	1	28,869					
KTXL Sacramento *	1	8,662	2.06	97.15	---	---	0.47
WCLQ Cleveland	1	8,425					
WDCA Washington *	1	18,631	1.95	90.47	2.26	1.42	3.89
WFLD Chicago *	2	86,227	0.40	96.25	2.44	0.03	0.79
WGN Chicago *	45	1,110,030	3.35	85.60	10.74	0.08	0.16
WGNO New Orleans	1	56,826					
WNEW New York *	1	15,016	9.42	90.30	---	0.01	0.27
WOR New York *	34	1,246,925	3.09	78.72	12.11	3.77	1.74
WPCB Greensburg, PA	1	7,059					
WPHL Philadelphia *	4	274,577	0.22	90.22	2.65	1.69	4.58
WPIX New York *	4	156,599	3.70	84.79	10.06	0.31	1.00
WPTY Memphis	1	10,638					
WSBK Boston *	5	230,700	1.00	81.47	17.19	0.04	0.24
WTAF Philadelphia *	7	372,997	0.89	88.08	9.29	1.07	0.40
WTBS Atlanta *	77	2,037,755	3.03	76.27	16.33	3.97	0.27
WTTV Indianapolis *	1	75,843	4.20	86.89	7.02	1.16	0.59
WVTV Milwaukee *	3	71,393	0.18	76.58	14.12	7.71	1.25

Total Independents (25)	197	5,991,211
Inds. in Nielsen Sample (16)	188	5,736,593
% Sample of Total	95.4	95.8

* "Nielsen Special Study 1983" Sample Station

TELEVISION STATIONS RETRANSMITTED AT 3.75% RATE, JULY - DECEMBER 1983

NETWORK AFFILIATES (47)		# OF SYSTEMS	ROYALTIES PAID (AT 3.75%)	"LOCAL"	SYND. SERIES & MOVIES	MAJOR SPORTS	MINOR SPORTS	DEVOTIONAL
					PERCENT OF STATION TOTAL VIEWING HOURS			
					(NON-NETWORK PROGRAMS)			
KING	Seattle	1	9,245					
KJRH	Tulsa	1	2,065					
KTEN	Ada, Oklahoma	1	2,545					
KTHV	Little Rock	1	2,660					
WABC	New York	1	6,330					
WAKR	Akron	1	3,432					
WAVE	Louisville	1	6,343					
WBAL	Baltimore	* 1	10,140	15.48	84.52	---	---	---
WBBM	Chicago	* 4	43,029	43.84	55.50	---	0.66	---
WBZ	Boston	* 3	27,787	37.67	56.60	5.31	---	0.14
WCBS	New York	* 2	11,264	47.25	52.75	---	---	---
WCJB	Gainesville, FL	2	7,818					
WDBJ	Roanoke	1	2,428					
WDHO	Toledo	1	3,499					
WFAA	Dallas-Ft. Worth	* 1	5,965	41.35	57.40	---	---	0.78
WGRZ	Buffalo	* 2	18,082	15.80	77.69	5.33	---	1.19
WHAS	Louisville	2	17,256					
WISC	Madison	1	15,417					
WISN	Milwaukee	2	8,583					
WITI	Milwaukee	2	8,583					
WIVB	Buffalo	* 2	18,082	11.57	88.21	---	---	0.22
WJAC	Johnstown	* 2	11,549	16.90	69.36	6.33	---	7.30
WJAR	Providence	* 3	19,656	3.91	94.36	---	---	1.73
WJZ	Baltimore	* 1	10,140	22.76	77.24	---	---	---
WKOW	Madison	1	15,417					
WKTV	Utica	2	6,056					
WKYT	Lexington, KY	1	14,312					
WKZO	Kalamazoo	2	5,019					
WLNE	Providence	1	2,676					
WLS	Chicago	4	49,757					
WMAQ	Chicago	3	32,968					
WMAR	Baltimore	* 1	10,140	6.73	85.84	7.26	0.02	0.14

* "Nielsen Special Study 1983" Sample Station

NETWORK AFFILIATES (47)		# OF SYSTEMS	ROYALTIES PAID (AT 3.75%)	"LOCAL"	PERCENT OF STATION TOTAL VIEWING HOURS (NON-NETWORK PROGRAMS) SYND. SERIES & MOVIES	MAJOR SPORTS	MINOR SPORTS	DEVOTIONAL
WMTV	Madison	1	15,417					
WMUR	Manchester	* 1	2,676	5.56	84.84	---	5.64	1.48
WNBC	New York	1	6,330					
WNDU	South Bend	4	22,869					
WOTV	Grand Rapids	2	5,019					
WPRI	Providence	* 3	22,684	1.00	97.78	---	0.73	0.50
WPTA	Fort Wayne	1	12,586					
WSBT	South Bend	1	5,540					
WSTM	Syracuse	1	15,650					
WTMJ	Milwaukee	3	21,839					
WTRF	Wheeling	* 1	7,164	11.25	83.71	1.13	---	3.86
WTVD	Durham	2	10,551					
WTVQ	Lexington, KY	1	33,686					
WVIT	New Brit-Hartford	* 4	69,338	11.00	80.47	4.76	3.44	0.33
WXYZ	Detroit	* 1	7,246	81.27	18.73	---	---	---
Total Network Affiliates (47)		81	666,838					
Affils. in Nielsen Sample (16)		30	294,942					
% Sample of Total		37.0	44.2					
Total "3.75%" Stations (72)		278	6,658,049					
Statns. in Nielsen Sample (32)		218	6,031,535					
% Sample of Total		78.4	90.6					

NON-COMMERCIAL STATIONS (0)   ---   ----   ---   ---   ---   ---   ---

WEIGHTED SHARES BY CATEGORY, NIELSEN SAMPLE STATIONS:

	ROYALTIES	"LOCAL"	SYND. SERIES & MOVIES	MAJOR SPORTS	MINOR SPORTS	DEVOTIONAL
INDEPENDENTS	5,736,593	2.71	80.99	12.54	2.44	0.81
NETWORK AFFILIATES	294,942	21.72	73.99	2.47	1.01	0.74
TOTAL	6,031,535	3.64	80.65	12.04	2.37	0.81

* "Nielsen Special Study 1983" Sample Station

BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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                                ||
DISTRIBUTION OF 1990,           ||
                                ||       Docket No.
1991 AND 1992                   ||       94-3-CARP-CD90-92
                                ||
CABLE ROYALTY FUNDS             ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Friday, December 15, 1995

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

Q   Now, in the last sentence of that paragraph, you indicate that the study is a direct measure of relative value of distant signal programs. What do you base that on?

A   Well, again, it's -- the survey was designed to be an attitudinal measure of relative valuation cable operators place on different program types.   That was -- you know, there's different research terms -- space floating.   On the face of it, those questions apparently asked cable operators to evaluate different kinds of program types, and the survey methodology was designed to collect appropriate data.   And that's what I based it on -- my understanding of how the survey was designed and conducted.

Q   All right.   Did you compare the program types asked in the survey with the categories defined by the tribunal?

A   Yes.

Q   And what was your conclusion from that comparison?

A   That I think the descriptors of the different category -- program category types were

appropriate. There is some variation in terms of the

wording, and then the specifics of how the tribunal

historically has defined program types. There is some

variation there, but in terms of the dominant

impression I think that the category types are

appropriately identified for measurement.

Q   Okay.   And what do you mean by the

"dominant impression"?

A   Well, when you're doing attitudinal

research or survey research, you need to measure

people's perceptions, or valuations in this case, and

you need to create an impression that people respond

to psychologically.   And you want to have a good

correspondence between what it is they're responding

to and what it is you're trying to measure.

That's   construct   validity   in   survey

research, but you can't go on ad nauseam being

extremely precise with, you know, a footnote kind of

approach to a survey question.   You want to have

something that creates a shared understanding between

the survey interviewer and the respondent, and then

they react to that.   So you create an impression of

shared meaning in a communication sense, and ask the

respondent to provide an appropriate answer structured

in the form of however the question is being measured.

1   So dominant impression is you could, in a

2 written form for example, in a different kind of

3 proceeding, go on and very precisely detail individual

4 circumstances and create a measurement that way. But

5 in survey research, it is far more practical to ask a

6 question the way that elicits a shared understanding

7 and capture that response.

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5   Q   Okay. Have you examined the definitions

6   of the tribunal and compared those to the statements

7   in the questionnaires?

8   A   Yes, I have.

9   Q   And what is your view of how close they

10   are?

11   A   I think that they are very close. If you

12   were to do a Venn diagram kind of approach where you

13   drew a circle around all of the different things that

14   would belong to one of the program types, as defined

15   by the Copyright Royalty Tribunal, and another

16   conceptual circle, you'll find all of the things that

17   cable operators might think of when you mention that

18   program type to them. I think that there would be a

19   large overlap between those two circles.

20   In other words, the correspondence between

21   the words used by the tribunal to defined program

22   types and the words in the survey question I think

23   would -- would engender an overlap.

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MUCH
DEFRANCO

BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,          ||
                               ||        Docket No.
1991 AND 1992                  ||        94-3-CARP-CD90-92
                               ||
CABLE ROYALTY FUNDS            ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Monday, December 18, 1995

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

1   P-R-O-C-E-E-D-I-N-G-S

2   (9:44 a.m.)

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10   WHEREUPON,

11   PAUL J. MUCH

12   WAS CALLED AS A WITNESS BY COUNSEL FOR THE NATIONAL

13   ASSOCIATION OF BROADCASTERS CLAIMANTS, AND HAVING BEEN

14   DULY SWORN, ASSUMED THE WITNESS STAND, WAS EXAMINED

15   AND TESTIFIED AS FOLLOWS:

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12   Q   All right. So, in light of this analysis

13 that you've just described, do you have an opinion as

14 to whether it would be sufficient to measure cable

15 operator evaluations of distant signal programs in a

16 way similar to what the Board's survey has done as a

17 basis for allocating the royalties in this proceeding?

18   A   Yes.

19   Q   And what is that opinion?

20   A   Well basically, the Board's survey -- when

21 you look at the allocation of value, one of the

22 principal issues is the benefit. And that is the

23 ability to retain existing subscribers and attract new

24 subscribers, similar to looking at where the economic

25 attributes if I buy a security, the ability to

1   generate cash flow or for the security to appreciate.

2   And the Board survey is basically testing

3   the investing public, and that is the buyers of the

4   particular signals.

5   And as a result the investing public

6   consensus as to how they value various types of

7   programming, that would be a fair and equitable and

8   appropriate basis to allocate value.

9   Q   And if --

10   A   It's a very similar situation.

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BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,                 Docket No.
1991 AND 1992                         94-3-CARP-CD90-92
CABLE ROYALTY FUNDS
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Tuesday, December 19, 1995

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

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9   Q   And so in the end, if you were -- back to

10   our original question: If you were attempting to

11   assess the relative value of distant signal programs

12   in the cable marketplace as a whole, would you look to

13   a measure that shows the aggregate value across all

14   cable systems at the cable operator level?

15   A   What you would want to see is -- I mean,

16   there's going to be some variation, I suppose, among

17   cable operators.

18   And I think it makes sense to ask the

19   cable operator how the cable operator values things

20   rather than looking a viewer measure or what the

21   viewers are saying about their preferences or how many

22   viewers are watching something.

23   You're asking which kind of information is

24   most relevant to making a decision is clearly what the

25   cable operator does or what the cable operator reports

1 on their own values that really should be given

2 primacy.

3   Q   Over any kind of subscriber intensity or

4 subscriber avidity?

5   A   Yes, that's right.

6   Q   I have no further questions.

7   CHAIRPERSON JIGANTI: Does the -- I have

8 a question before we start the cross examination.

9 Does the survey take into account what Mr. Stern

10 stated a while ago, that is the fact that these

11 programs, we're talking only about broadcast channels

12 who take into account the fact that deciding whether

13 to purchase these distant signals, they already have

14 competing programming on the cable networks?

15   THE WITNESS: Well, I would think that in

16 asking a cable operator how you do you value incoming

17 -- you know, programming on distant signals that you

18 might bring in, that the cable operator would

19 necessarily reflect what's already available in the

20 local marketplace.

21   CHAIRPERSON JIGANTI: So the question

22 implies that. Is that correct? The question asked to

23 the interviewee implies that the valuation the cable

24 system operator is concerning the alternatives on

25 network cable?

1   THE WITNESS: I would think that would be

2   the case.   Now, I'm not an expert in survey

3   methodology.   But I seems to me that it would be

4   difficult for the operator to answer that question

5   without thinking about the situation the cable

6   operator is actually in.

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1   Q   Finally, you described or you discussed

2   with Judge Wertheim, the likelihood that a cable

3   system operator would actually be able to identify and

4   describe what you called the algorithm that he applied

5   in coming up with a bundle of programming that he put

6   together. Do you recall that?

7   A   That is correct.

8   Q   Now, a cable system operator, unlike you

9   when you purchased your four wheel drive vehicle,

10   purchases programming bundles in order to sell them in

11   the market place, is that correct?

12   A   That is correct.

13   Q   But he has some economic value associated

14   with the programming bundles that is distant signals,

15   related to how much money he actually makes when he

16   goes and resells them to subscribers, is that correct?

17   A   That is correct.

18   Q   In your view, do you think that a cable

19   system operator, having purchased distant signals and

20   having resold them to subscribers in the market place,

21   would be able to tell you the relative values of those

22   components of those programs, even if he couldn't

23   describe what you called the algorithm by which he had

24   determined them?

25   A   Yes.   Through   trial   and   error   you

1   necessarily have to come up with some sort of an

2   assessment of relative values.

3   And it doesn't say that I know that I am

4   using a bundle in the way that economists describe

5   things.   This is a problem or a question that

6   economists are constantly confronted with, that

7   because most of our work is done with calculus and

8   most business people and consumers don't know

9   calculus, obviously they didn't use calculus in

10   deciding how much they were going to buy and how much

11   they are willing to pay.

12   Nevertheless, the process of comparing how

13   they feel or the profits they realized from different

14   bundles or products that they provide and changing the

15   mix and comparing it again, they should end up by

16   discovery and experimentation with the outcome that is

17   predicted by the logic that economists use.

18   Therefore, a survey asking people how do

19   they value this should reflect their experience in the

20   market place.

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BEFORE THE

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DISTRIBUTION OF 1990,           ||
                                ||      Docket No.
1991 AND 1992                   ||      94-3-CARP-CD90-92
                                ||
CABLE ROYALTY FUNDS             ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Thursday, January 18, 1996

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

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20   Q   And what percentage of U.S. households

21   watch public television over the course of a month?

22   A   Well in a month, if you use the Nielsen

23   statistic known as cum, or cumulative audience -- in

24   talking about household, cumulative audience defined

25   as the percent of U.S. t.v. households that tuned in

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1 for at least six minutes during the month -- it's

2 approximately 80 percent.

3   Q   And what does that tell you about the

4 attractiveness of public television in terms of

5 offering different niches of programming?

6   A   Well, that it's widely used by the public.

7 I mean, that's a very important statistic to us. We

8 are heavy on the use of cums, in many ways moreso than

9 an average audience as commercial television uses,

10 because the cum gives you an idea about the public's

11 use of public television.

12   So we want to be sure that we're reaching

13 with our various small audience programs the American

14 public.

15   And 80 percent, of course, tells you that

16 most of them are, in fact, using our service.

17   Q   Is it a gage of the fact that public

18 television is offering programming that reaches a

19 bunch of different niches?

20   A   Well when you break all the data down and

21 analyze it, you know, that's very clear because we

22 certainly don't have individual programs with an 80

23 rating. Nobody does.

24

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CROSS EXAMINATION

BY MS. HAND:

Q   Good morning, Mr. Fuller.   My name is Jacqueline Hand and I'm appearing on behalf of the National Association of Broadcasters. As you probably know, we're here representing U.S. Commercial Television Stations for their station produced programming.

A   Yes.

Q   Mr. Fuller, is it your understanding that the Bortz survey attempted to measure the cable operators valuation or relative valuation of the various programming categories?

A   Yes, it was.

Q   Have you performed survey research yourself?

A   Yes.

Q   And in your experience, do you attempt to design surveys to capture real world considerations?

A   Yes.

Q   Sorry?

A   Yes, we do.

Q   In your opinion, does the Bortz survey capture the cable operators -- let me rephrase that. In your opinion, does the Bortz survey enable cable operators to take into account real world factors in making their relative valuation?

1   A   Yeah, I think they do. I think that the

2 Bortz survey, as surveys go, pretty hard measure in

3 the sense that they are working off their own

4 experience from decisions that we have made about what

5 they carry and what they don't, about information

6 they're intimately familiar with and so I should think

7 that the measure provided by Bortz was something that

8 would be answered by a cable operator during an

9 interview with some authority and a well-informed

10 decision.

11   Q   And in your opinion would cable operators

12 think about their own experience in answering the

13 questions to the Board survey?

14   A   Certainly.

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Q   Now, you state in the next sentence on page 3, the second sentence under 1 that "the Bortz study provides the most reliable source of information available on benefits to the cable operators." Do you see that?

A   I do.

Q   And what is the basis for you stating that it's the most reliable source of information?

A   It's reliable in the sense that it's the most logical and appropriate source for defining value from a cable operator.

I believe that asking the cable operators how they assign relative value to the different program categories is a direct measure and that's what

1   Bortz did and that's what we should use as opposed to

2   say some viewer measure, which is not a measure of the

3   cable operators themselves.

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BEFORE THE

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DISTRIBUTION OF 1990,          ||
                               ||    Docket No.
1991 AND 1992                  ||    94-3-CARP-CD90-92
                               ||
CABLE ROYALTY FUNDS            ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Friday, January 19, 1996

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

I N D E X

WITNESS	DIRECT	CROSS	REDIRECT	RECROSS
M. Peter Downey				
By Ms. Woods	5367		5518	
By Mr. Stewart		5458		
By Mr. Lane		5472		
Dr. William Fairley				
By Mr. Hester	5538			
By Mr. Stewart		5621		
By Mr. Lane		5625		

E X H I B I T S

Exhibit No.	Description	Marked	Received
Public Television			
41			5367
42			5367
43	PBS Financial Data	5421	5423
Program Suppliers			
44-X	PBS Income FY91 & FY92	5481	5537
45-X	Public Television Service Structure and Analysis	5499	5537
46-X	Carriage of PBS around Elkhart and Jacksonville	5505	

BY MR. STEWART:

Q   Thank you.   Mr. Downey, do you have PTV Exhibit 43?

A   Yes.

Q   I want to talk with you about the last line there: estimated expense on local programming. Do you see that?

A   Yes.

Q   Now first looking at your Exhibit 42 flow chart, does that bottom line encompass both of these boxes on the lower left-hand here, the local program production and acquisition and program acquisitions for regional networks?

A   In retrospect, I would -- it doesn't really fit either because I need to make an adjustment to the text in the box to make it work right.

Q   Yes.

A   What I would do is strike the word "acquisition" from the left-hand box --

Q   Yes.

A   -- and then all of this money belongs in that box.

Q   I see.   So it does not include any money

1   that's spent by local stations on acquiring programs

2   from others?

3   A   From third parties.

4   Q   Okay.

5   A   It does not.

6   Q   Okay.   Secondly, does it include

7   expenditures on production on programs by stations, by

8   individual stations, that are then broadcast on other

9   PBS stations?

10   A   Quite possibly, yes. The first instance

11   is the money left at the station with which it can

12   produce local programs.

13   And a large part of this is the sort of

14   infrastructural cost of producing local programs,

15   having staff, producers, directors, PAs, what have

16   you.

17   But ultimately a program gets produced.

18   It may only be shown in that market, but that -- but

19   it's very common because again of the independent

20   nature of public television for stations to share

21   their local productions with other communities, to the

22   extent it's relevant, of course.

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8   Q   Okay. Now finally, we talked about -- you

9 talked before about taking that roughly $300 million

10 number across the bottom line there and calculating --

11 and expressing it in terms of an average per entity.

12 Is that right?

13   A   Correct.

14   Q   And you did that by dividing that total by

15 about 200. Is that right?

16   A   Correct.

17   Q   Now did I understand your testimony

18 correctly that 200 -- that there are more than 200

19 separate stations?

20   A   Transmitters.

21   Q   All right, and let's use the term

22 "transmitter." And let's look at the WGBH example you

23 gave for example.

24   A   Yes.

25   Q   What are the call signs of the stations in

1 Boston?

2   A   There are two stations in Boston: WGBH,

3 Channel 2, and WGBX, Channel 44.

4   Q   Okay, and the -- and WGBH or the --

5   A   There's one building that contains a staff

6 that operates both stations.

7   Q   Okay. And then there's also a Springfield

8 transmitter?

9   A   There is a separate operation in

10 Springfield, a separate staff, separate transmitter,

11 Channel 56, WGBY --

12   Q   Okay.

13   A   -- which is licensed to the WGBH

14 Educational Foundation, but operates, by and large,

15 individually of the Boston station.

16   Q   Okay. And if you were to look at the

17 question from the perspective of a viewer, a viewer

18 would perceive of those three different transmitters

19 as each being a broadcast station, correct?

20   A   Correct.

21   Q   Okay. And each of the three of those

22 could be carried by a cable operator as a separate

23 distant signal, correct?

24   A   That's correct.

25   Q   Okay. So looking at it in that sort of

1 colloquial sense, this one -- the three WGBH

2 transmitters are, in effect, three public television

3 stations, correct?

4   A   They are each individual and independently

5 licensed by the FCC as a non-commercial educational

6 television station.

7   Q   Okay. And are there 350, or roughly 350,

8 such stations in that sense in the PBS universe?

9   A   That's correct.

10   Q   Okay. So if you looked at an average

11 expenditure by station, you would divide by 350

12 instead of 200. Is that right?

13   A   You could do that, yes.

14   Q   Okay. So you would get something under $1

15 million per transmitter if you calculated the average

16 in that way?

17   A   That's correct.

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22   CROSS EXAMINATION

23   BY MR. LANE:

24   Q   Mr. Downey, I'm Dennis Lane.   I'm

25 appearing on behalf of Program Suppliers. Could you

1   turn to page three of your -- page three of your

2   testimony?

3   A   Yes.

4   Q   In the first full paragraph, you indicate

5   that there are more requests for funding that can be

6   met by PBS's limited resources. Do you see that?

7   A   Yes.

8   Q   Do you think there is -- that's any

9   different from the situation in commercial television?

10   A   I don't know with any precision, but I

11   would expect there are more requests or more proposals

12   considered by commercial broadcasters than they are

13   able to or willing to finance.

14   Q   And -- I thought I could talk to you about

15   this Exhibit 43 here and the sources of the funding.

16   When you -- when you talk about the producers being

17   under constant -- well, first you talked about the

18   programs being under constant pressure to reduce their

19   budgets. Do you see that?

20   A   Yes.

21   Q   That paragraph? Is that -- do you think

22   there is any difference in the commercial marketplace

23   than public television on that?

24   A   I think to some extent, the circumstances

25   are different. I think in both cases there is

1   . probably always the hope -- hope springs eternal. One

2   would like to pay less than -- than perhaps the

3   offered price.

4   But it wouldn't surprise me to learn that

5   on the commercial side, there is also pressure to

6   reduce budgets.

7   Q   Okay. Now can we just go to Exhibit 43?

8   And I'm a little bit confused by this that the numbers

9   that we added -- or at least I added at the bottom of

10   the page for program production by station, those were

11   numbers roughly in the magnitude of $600 to $650

12   millon?

13   A   Yes. The amount extended by stations on

14   programming and production.

15   Q   Right. And as I understand it, if we take

16   the first line of that page, that is -- that is their

17   income for each of the fiscal years.

18   A   Right.

19   Q   That's like a $1.2 billion to almost $1.4

20   billion?

21   A   Correct.

22   Q   And you're saying they cut roughly half of

23   that for total cost of program production, correct?

24   A   Correct.

25   Q   And that --

1   ARBITRATOR WERTHEIM: Excuse me, where is

2 the $600 million figure? I don't see it.

3   THE WITNESS: It's the figures we wrote up

4 on the --

5   MR. LANE: You didn't write it into the

6 box. You're supposed to do that.

7   THE WITNESS: It was this set of figures.

8   ARBITRATOR WERTHEIM: Oh, I see. That's

9 what you -- I forgot about that.

10   BY MR. LANE:

11   Q   And these program production costs by

12 stations are related directly to the PTV income. I

13 mean, we're talking about the costs by the stations

14 and their revenues, correct?

15   A   Yes.

16   Q   Okay. So as I understand it, roughly half

17 of their income goes to program production?

18   A   Correct.

19   Q   Okay. And then half of that is that

20 estimated expense on local programming, right?

21   A   Correct.

22   Q   All right. So now, that leaves, for all

23 practical purposes, somewhere around $300 million

24 between what they've spent on local programming and

25 what their total program production cost is, correct?

1   A   Correct.

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1   consider to be an overlap situation?

2   A   Overlap is a term we usually use in a

3   different context.

4   Q   Okay. How do you use it?

5   A   The best example that comes to mind

6   immediately would be here in Washington we have two

7   stations licensed to the District of Columbia -- WETA,

8   Channel 26, and WHMM, Channel 32. And they overlap

9   each other, because their signals are essentially

10   concentric.

11   Q   In what percentage of markets served by

12   PTV are there overlap situations?

13   A   Oh, gosh. Well, there are -- to the best

14   of my recollection, there are about -- there are,

15   obviously, degrees of overlap. For the kind of case

16   I just described where they almost literally are

17   virtually concentric, there are about two dozen

18   situations like that, not all in major markets but

19   predominantly.

20   Q   And how much overlap would there be that

21   aren't an exact match?

22   A   Well, these are, of course, gradations.

23   The -- I don't know, it's very hard to come up with

24   anything -- any kind of precision about this. I mean,

25   we are -- here in Washington, we're able to see the

1   Annapolis, Maryland, station, and some people in

2   Montgomery County can see the Hagerstown station. So,

3   you know, it's a -- there is this kind of infinite

4   gradations.

5   Q   Well, I was wondering if there are 350

6   stations in roughly 210 markets in the United States,

7   there are 350 public television stations as we've

8   defined that --

9   A   Yes.

10   Q   -- transmitters, and roughly 210, does

11   that give us some idea that roughly each market -- I

12   know this is a gross, rough estimate -- but roughly,

13   there is one and a half public television stations for

14   each market in the country?

15   A   I'm a little uncomfortable with that for

16   this reason. The designation of (quote) "markets" by

17   Nielsen and Arbitron is relatively arbitrary. And

18   when you -- particularly when you get out west, a

19   market can be the size of a -- the size of an area

20   code.

21   We have stations in -- the second point is

22   the physical location of a public television

23   transmitter may or may not appear on its face to be

24   rational with respect to conventional market behavior

25   for this reason.

1   If you take a state like South Carolina or

2   Alabama -- and there's about 25 different state

3   systems -- what they have done is to place their

4   transmitters in a way to reach the population of the

5   state, not so much the population of a particular

6   city. And so those transmitters get sprinkled around

7   the state for reasons other than, you know,

8   conventional commercial market-by-market approaches.

9   So the one and a half per market is a bit of a

10   stretch.

11   I think I'd be more comfortable with -- as

12   I said a moment ago, there are about two dozen --

13   well, for want of a better term -- hard-core

14   overlapping situations like WHMM and WETA, and then it

15   tails off fairly quickly.

16   Q   Now, at the bottom of page 5, you talk

17   about the example of Sacramento, California. Do you

18   see that?

19   A   Yes.

20   Q   And that is a situation where another --

21   a San Francisco station is carried in the same area

22   that KVIE is?

23   A   KQED is -- is carried on cable systems in

24   Sacramento, which by definition makes it a distant

25   signal.

1 Q   And have you seen membership fall off in

2 Sacramento as a result of that? Is that what is

3 occurring here?

4 A   We -- you don't see fall off so much for

5 the reason that, you know, KQED has been available in

6 Sacramento for as long as there has been cable. So

7 the only time you would expect to see that is if at a

8 particular moment in time, a contemporary moment in

9 time, suddenly a distant signal appeared and then you

10 might expect to see fall off of viewing and

11 potentially membership, yes.

12 Q   Well, you -- I'm sorry.

13 A   The point is that Sacramento is faced with

14 the constant struggle of getting Sacramentoans to

15 contribute to the local station.   And to whatever

16 extent people in Sacramento are watching KQED, and

17 therefore are not contributing to the local station,

18 is the point we're trying to make.

19 Q   And I think you indicated earlier this

20 morning that roughly 10 percent of viewers, on

21 average, contribute --

22 A   Are contributors. At any one moment --

23 well, we have about 5.2 million members, subscribers.

24 That could be a person or a family. And there are --

25 in the prime time -- in our prime-time weekly cum,

1   there is about 55 million households, so that's where

2   I get the figure one in 10.

3   But I would also make the point that we

4   also know from research that about three in 10 have

5   ever been a contributor. At any one time it's about

6   one in 10.

7   MR. LANE: At this time, Mr. Chairman, I'd

8   like to introduce as Program Suppliers Exhibit 45-X

9   pages from a document that was supplied to us by

10   counsel.   It's called Public Television Service

11   Structure and Analysis. I have the entire document.

12   (Whereupon, the above-referred

13   to document was marked as

14   Program Suppliers Exhibit

15   No. 45-X for identification.)

16   BY MR. LANE:

17   Q   Is this a document that you've seen

18   before, Mr. Downey?

19   A   Yes.

20   Q   And it was prepared for public television,

21   was it not?

22   A   It was commissioned by the Association of

23   America's Public Television Stations, which is, for

24   want of a better term, public television's lobbyist

25   organization here in Washington. It's not associated

1   with PBS. It's a different company from PBS.

2   Q   Now, I'd like to turn first to pages 6 and

3   7 of this document, and the pages are on the top

4   right-hand side. And I have the complete document

5   here if you feel you need to look at that.

6   One of the things that -- let me ask you

7   this. Are you generally aware that public television

8   does worse in cable homes than it does in non-cable

9   homes?

10   A   I'm aware of that.

11   Q   And that would be reflected on the data

12   that are presented on 6 and 7, is that --

13   A   I haven't had a chance to look at this,

14   but --

15   Q   Well, would you do that and just --

16   A   Yes.

17   Q   Okay. Would you please turn to the page

18   that is marked number 33 on the top right-hand corner?

19   Do you have that?

20   A   Yes.

21   Q   And do you see in -- not really a chart,

22   but there are some numbers in sort of a chart-like

23   form in the middle of the page.

24   A   Yes.

25   Q   And that refers to Sacramento, does it

1   not?

2   A   Yes.

3   Q   And that also refers to KVIE, and is that

4   the same station to which you were referring on page 5

5   of your testimony?

6   A   Yes.

7   Q   And according to this snapshot,

8   approximately 11.3 percent of the Sacramento

9   metropolitan area TV households were members of public

10   television, is that how you read this?

11   A   That's how I would read that.

12   Q   Okay. So that at least at the time that

13   this study was done, it appears that Sacramento had a

14   membership level that was consistent or at least

15   reached the average of what you would kind of expect,

16   is that right?

17   A   No, not -- actually not. Have to be

18   careful.. The -- when I say -- what we say is of those

19   who watch public television, are regular watches of

20   public television, about one in 10. Remember I said

21   that our prime-time weekly cumulative audience is

22   about 50 percent of all U.S. TV households, which is

23   about 50 million households in round numbers, and we

24   have five million subscribers.

25   If you take our five million and project

1 it to the entire population, it is only one in 20,

2 rather than one in 10. The way I read this data here

3 is that 11 percent of all TV households in Sacramento

4 are members, not just those who watch but of all TV

5 households. So this is really about twice the -- the

6 average. If you were twice as good as --

7   Q   Okay.

8   A   -- the average.

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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Friday, January 19, 1996

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

I N D E X

E X H I B I T S

1   identification, were received

2   into evidence.)

3   Is there anything further?

4   MR. HESTER: I'm sorry, Your Honor. I

5   didn't think the witness figured he was going to talk

6   for a while.

7   The Public Television Claimants, Your

8   Honor, call as their next witness Dr. William Fairley

9   to the stand.

10   CHAIRPERSON JIGANTI: Dr. Fairley, would

11   you stand please and raise your right hand?

12   WHEREUPON,

13   DR. WILLIAM B. FAIRLEY

14   was called as a witness by Counsel for the Public

15   Broadcasting Corporation Claimants and, having been

16   first duly sworn, assumed the witness stand, was

17   examined and testified as follows:

18   DIRECT EXAMINATION

19   BY MR. HESTER:

20   Q   Could you state your name for the record,

21   please?

22   A   William B. Fairley.

23   Q   And are you sponsoring the testimony of

24   William B. Fairley that has been submitted with the

25   direct case of Public Television Claimants?

1   A   Yes.

2   Q   And, Dr. Fairley, what is your present

3 position?

4   A   I have a consulting practice in

5 statistics. The vehicle is a firm called Analysis and

6 Inference, Incorporated, located in Swarthmore,

7 Pennsylvania.

8   Q   And what is your position with Analysis

9 and Inference?

10   A   President.

11   Q   And how long has Analysis and Inference

12 been in existence?

13   A   Since 1979.

14   Q   What is your educational background,

15 Dr. Fairley?

16   A   Let's see, I went to high school in

17 Virginia. I graduated from Swarthmore College with a

18 B.A. in Economics. I had a year at the London School

19 of Economics and began graduate studies in economics

20 at Harvard but soon after that changed to statistics,

21 and I received a Ph.D. in statistics from Harvard

22 Department of Statistics.

23   Q   And what did you do after graduating from

24 Harvard with your Ph.D. in statistics?

25   A   The first job I had was with the First

National Citibank in New York, Citibank as it is known

now. I also taught part-time as an Adjunct Assistant

Professor at the NYU School of Business. Then I

worked briefly at the -- what was called the New York

City Rand Institute. It was an off-shoot of the Rand

Corporation. I did work for the city government on --

for various urban issues. And I finished up my period

in New York teaching full-time at NYU Business School.

After that, I taught in the Public Policy

Program at Harvard in the School of Government for six

years as an Assistant -- an Associate Professor.

After that, I worked for almost three years for the

Insurance Commissioner in Massachusetts -- James

Stone. And at that time, I decided to -- to go into

business and started Analysis and Inference in Boston.

Q   And have you taught statistics and applied

statistical techniques?

A   Yes, I -- I taught that full-time at NYU.

I taught it almost full-time at Harvard, and we also

had some other duties, workshops in public policy and

the like. Since then, the last several years, I have

taught off and on at Swarthmore College. I gave a

course at Temple University in Philadelphia -- gave a

few courses. I was a Visiting Professor in the

Department of Statistics and Operations Research at

1 the NYU Business School, I guess it was four years

2 ago.

3 Q   What is your general field of expertise,

4 Dr. Fairley?

5 A   Generally, it's statistics with a strong

6 background in economics, very generally, and then I

7 have other -- a few other kind of subspecialties.

8 Q   Have you previously testified as an expert

9 in statistics in litigation?

10 A   Yes, a number of times.

11 Q   Now, Dr. Fairley, do you have any

12 corrections to make to your written testimony,

13 specifically to Table 1?

14 A   No.

15 Q   With respect to -- do you have any

16 corrections to make with respect to the confidence

17 intervals on Table 1?

18 A   Oh. Simply to point out something that

19 might have been in the discussion or a footnote that

20 these -- this -- these are -- it's really a pretty

21 technical point, because it doesn't -- I don't think

22 it's going to make much difference.

23 Q   For the record, this is -- you're talking

24 about Table 1, which appears after page 9 of your

25 testimony?

1   A   That's right.

2   Q   Okay.

3   A   And it has to do with whether you -- a

4   combination of the uncertainty arising from the -- the

5   models that I used, as I'll explain, and the

6   uncertainty in the -- the sampling -- the fact that

7   these data are drawn from a sample of systems.

8   Q   So do you have any corrections to make?

9   A   No.

10   Q   Okay.

11   MR. HESTER: At this time, Your Honor, I

12   would make the witness available for voir dire.

13   CHAIRPERSON JIGANTI: Any questions for

14   Dr. Fairley? Hearing no questions, you may proceed.

15   BY MR. HESTER:

16   Q   Dr. Fairley, could you provide an overview

17   of the reason for your written testimony?

18   A   Yes. The -- in the Bortz survey of cable

19   systems, they had between five and seven program

20   categories. Now, when a system did not carry PBS for

21   a Canadian station, they gave -- they said the share

22   for -- for PBS and for Canadian programming was zero

23   for that system. That's what I call, and maybe the

24   phrase has been used here, an automatic zero.

25   So it's -- they are forced to be zero,

1   whereas for no other program category is that true.

2   And so the -- that's essentially the problem that is

3   being addressed, what to do about that.

4   Q   Now, would that automatic zero methodology

5   cause the value of PBS programming to be understated

6   in the Bortz survey?

7   A   Yes.

8   Q   And why is that?

9   A   Because it's certainly going to be true

10   that if you ask people, even if they don't carry it,

11   many will -- will think there is some value to it.

12   And in terms of the phraseology of question 4A, to ask

13   the respondents about the relative value to them of

14   having these various programming categories for

15   getting and retaining subscribers, if the question was

16   simply asked, many of the respondents I think would --

17   would accord to some value to PBS or -- or to the

18   Canadian --

19   Q   Now, in the 1989 case, did the Copyright

20   Royalty Tribunal consider the issue of whether an

21   adjustment was needed to take account of this

22   automatic zero methodology?

23   A   Yes, I read their decision.

24   Q   And did the tribunal, in that case, apply

25   an adjustment factor to the Bortz results in 1989, to

1   take account of that automatic zero methodology?

2   A   It did.

3   Q   And that caused an increase in PBS's

4   share?

5   A   Yes.

6   Q   Why can't we simply apply that same

7   adjustment factor that the Copyright Tribunal used to

8   the Bortz results for the years 1990 to '92?

9   A   Well, that -- that factor was introduced,

10   correctly I think, for recognition that there was a

11   problem. But the actual factor itself was really a

12   back-of-the-envelope kind of thing. The calculation

13   was setting aside Canadian programming. There are six

14   categories including PBS and five if you exclude PBS.

15   So the ratio of six to five was taken to

16   say, "Well, we'll ratchet up PBS by this ratio," which

17   is 1.2, to somehow account for dropping PBS out of the

18   five when five were asked.

19   Q   And was that what you would consider a

20   statistically rigorous way of adjusting for this

21   issue?

22   A   No, not at all. It had no basis in

23   something that you're estimating. It was something

24   that seemed plausible, went in the right direction.

25   Q   So have you undertaken here to apply

1   statistical techniques to derive adjusted values for

2   PBS to take account of this automatic zero

3   methodology?

4   A   Yes.

5   Q   And are you deriving estimated values for

6   those who were not asked about PBS based on the

7   responses of those who were asked?

8   A   Exactly.

9   Q   Is that the general way that you undertook

10   to do this?

11   A   Yes.

12   Q   So have you derived estimates based on the

13   survey results as measured by Bortz?

14   A   Yes.

15   Q   Is your analysis based on novel

16   statistical techniques?

17   A   No, it -- it uses standard statistical

18   models. This is a common problem in statistics that

19   for one reason or another you have what are called

20   missing values. And the -- there are many approaches

21   to getting around the problem, but almost all of them

22   involve finding a good technique to estimate what

23   those missing values are, to then substitute them and

24   use them in the analysis you want to do.

25   Q   So is there a generally recognized body of

1 statistical literature on the process of estimating

2 missing values?

3   A   Oh, yes. There has been a lot of recent

4 work -- well, not so recent work. About 10 years ago,

5 Donald Rubin is the most prominent statistician

6 involved there.   He has written two books and

7 countless articles on this subject. There are many,

8 many statisticians in universities who -- this is a

9 whole field.   You go to statistics meetings and

10 there's always a session on missing values.

11   Q   Everybody here would like to go to a

12 statistics meeting after they get done with this case.

13   A   I'm sure.

14   Q   Let me ask you to turn to page 4 of your

15 testimony, please. I want to begin generally with a

16 discussion of the Bortz survey results. On page 4,

17 you summarize the Bortz results related to public

18 television. What do these results reflect?

19   A   Well, in the top table, in each of the

20 years '90, '91, and '92, the -- over in the right are

21 the sample sizes for the Bortz survey -- 173 in 1990,

22 for example. Then, the 27 in that line are the number

23 out of the 173 who actually carried a PTV distant

24 signal. And the balance, 146, are those who were --

25 were the automatic zero value for PBS. So this lays

1   out the results of the survey that way.

2   Q   So taking it from there, if you look down

3   at the bottom of the page, and you show there a PBS

4   share for 1990 of 15.4 percent among the respondents

5   carrying a distant public television signal, what does

6   that number reflect?

7   A   That's the average of the shares they

8   reported to the interviewers for the 27 in 1990, for

9   the 27 systems that carried a PTV distant signal. So

10   it's their average share response.

11   Q   So among those who were actually carrying

12   a distant public television signal, that's the average

13   value that was reported in 1990?

14   A   That's correct.

15   Q   And does the same explanation apply to the

16   numbers for 1991 and 1992?

17   A   Yes.

18   Q   Now, the other column at the bottom of the

19   page shows something you've headed "PBS Share in Bortz

20   Survey." Do you see that?

21   A   Right.

22   Q   And what do those numbers reflect? And,

23   again, just for purposes of an example, let's focus on

24   1990.

25   A   Those are the estimates found in the Bortz

report on the 1990 -- the 2.7 is the estimate found for the 1990 survey. And the reason it's so much lower than 15.4 is it -- primarily, that 146 stations were assigned these automatic zeroes. So what you have there is the average of 27 shares for PBS that were reported, plus 146 zeroes, divided -- all divided by 173.

Q   So the reason that number is substantially lower than the results among those who carried a distant public television signal is really a function of taking a weighted average of a lot of zeroes and the responses that were given by those who were actually carrying a signal? Is that fair?

A   Yes. You know, roughly on the order of four-fifths of the cases in the several years are -- were automatic zeroes.

Q   Now, let me ask you to turn to PTV Exhibit 38. Do you have the exhibits arranged that way?

A   Yes.

ARBITRATOR WERTHEIM: 38?

MR. HESTER: 38, Your Honor.

ARBITRATOR WERTHEIM: Thank you.

CHAIRPERSON JIGANTI: Do you mind if we go back one second?

1   MR. HESTER: Sure.

2   CHAIRPERSON JIGANTI: Mr. Hester said that

3 this was a weighted value. Is that the proper

4 terminology?

5   THE WITNESS: You can -- yes, it is. It's

6 weighted in several senses. It's actually a -- what's

7 called a stratified ratio estimator of a revenue

8 weighted average for the whole group. So it's --

9 there is actually a couple of different kinds of

10 weightings going on there.

11   CHAIRPERSON JIGANTI: But with regards --

12   THE WITNESS: But what he is --

13   CHAIRPERSON JIGANTI: -- to the zeroes --

14   THE WITNESS: -- the zeroes, what he is

15 really talking about is simply that if you add up the

16 27 guides for PBS, and add the zeroes, divide by 173,

17 yeah, you can view that as a weighted estimate, as --

18 what it is is the -- with the weights being 27 over

19 173, and 146 over 173, you're taking the average of

20 15.4 weighted by the proportion of -- of 27 to 173,

21 plus it's really the -- it's the weighted average of

22 15.4 and zero. And the weights are, for 15.4, the

23 fraction of the systems that carried PTV, 27 over 173.

24 So you multiply that fraction times 15.4, and then you

25 add zero, which is the average of the zeroes times the

1   -- the other fraction or 146 over 173.

2   BY MR. HESTER:

3   Q   Dr. Fairley, let me see if I can just work

4   it through this way, and tell me if it makes sense.

5   First of all, this won't come out exactly correctly

6   this way unless we take account of the stratified

7   ratio estimator that you mentioned. But if we took a

8   simple weighted average, if you had in 1990 -- could

9   you look at it this way, as 27 -- 27 times the average

10   share reported of 15.4 plus 146 zeroes? And then if

11   you divided that by 173, is that roughly the point

12   that you're making that it's, roughly speaking, a

13   weighted average?

14   A   Yes, and you can -- and if I can just --

15   Q   Sure.

16   A   -- transform your equation into --

17   Q   What it equals. Pull out the weight, make

18   it a little clearer perhaps. Right. You've got 27

19   over 173, times the share of 15.4, plus 146 over 173,

20   times zero, and that fraction roughly works out to

21   something comparable to this PBS share that you show

22   for 1990, is that right?

23   A   Yes.

24   ARBITRATOR FARMAKIDES: What is the

25   significance, sir, of having 146 times zero in that

1 equation? Isn't that zero?

2   THE WITNESS: Up here?

3   ARBITRATOR FARMAKIDES: Yes.

4   THE WITNESS: Zero, in this context, is

5 viewed as the -- as the average of 146 zeroes.

6   ARBITRATOR FARMAKIDES: 146 zeroes are

7 zero.

8   THE WITNESS: Exactly.

9   ARBITRATOR FARMAKIDES: I'm not sure I

10 understand. What is the significance of 146 zeroes in

11 that equation?

12   THE WITNESS: These are the automatic

13 zeroes. So if you want to find the average over all

14 173 systems of the share of values that the survey

15 assigned, you want to add up what -- another way to

16 look at this is 15.4 is some total number of shares

17 divided by 27. So if you cancel the 27's, this whole

18 thing is -- is equal to the total, just adding up all

19 of the shares for the 27 that weren't automatically

20 zero. That's the total of those.

21   And then, obviously, this thing is --

22   BY MR. HESTER:

23   Q   When you say "this thing," you're talking

24 to the 146 --

25   A   Times zero --

1   Q   -- times zero.

2   A   -- is the sum of 146 zeroes, which of

3 course is zero.

4   ARBITRATOR FARMAKIDES: So why does that

5 fit in there? What is the significance of that? I

6 understand what you're saying. But in your equation,

7 what is the significance of that?

8   THE WITNESS: We -- we started out, the

9 question was is -- can you do 2.7 percent as a

10 weighted average?

11   ARBITRATOR FARMAKIDES: Yes.

12   THE WITNESS: And I'm trying to answer

13 that. This is the sense in which it is a weighted

14 average. It's a weighted average of the average

15 response from the 27 and the average response from the

16 147, where the weights are these two fractions -- 27

17 over 173 and one minus that fraction, or 146 over 173.

18   ARBITRATOR FARMAKIDES: Now, your 146 over

19 173 is times zero.

20   THE WITNESS: Yes.

21   ARBITRATOR FARMAKIDES: So that's zero.

22   THE WITNESS: That's zero.

23   ARBITRATOR FARMAKIDES: Okay. I'm still

24 -- that's all right. Proceed. I -- maybe I'll catch

25 on.

1   ARBITRATOR WERTHEIM: I think what he's

2 asked is why do you have the 146 times zero or the 146

3 times zero over 173. It's all going to be zero.

4   THE WITNESS: It's all zero. Why bother?

5   ARBITRATOR WERTHEIM: Why bother?

6   THE WITNESS: Is that the issue?

7   ARBITRATOR   FARMAKIDES: There's no

8 significance to the equation, insofar as I can see, by

9 having 146 -- unless you're doing it merely to clarify

10 the equation.

11   THE WITNESS: I'm trying to respond to the

12 question, which was, is it a weighted average? And I

13 said it was. Now, a weighted average has two terms

14 usually, and so I'm going to show -- this is the first

15 term, and this is the second term.

16   ARBITRATOR WERTHEIM: But let me ask you

17 this way, sir. If you had 27 respondents carrying a

18 distant signal, and 173 total respondents, do you need

19 to know or even care how many said zero or were

20 assigned a zero?

21   THE WITNESS: Well --

22   ARBITRATOR WERTHEIM: Isn't the 27 and the

23 173 the key number?

24   THE WITNESS: I'm not sure I -- I follow

25 your question, in that the problem here is these

1 automatic zeroes itself. I'm working up to explain

2 how to estimate these missing values.

3 　　　　ARBITRATOR WERTHEIM: Well, I can see why

4 for informational purposes you'd put the plus 146

5 times zero. But once you've informed us of that,

6 can't we just ignore it because zero is zero?

7 　　　　THE WITNESS: Absolutely.

8 　　　　MR. HESTER: I may be the culprit here.

9 I have --

10 　　　　THE WITNESS: This is the answer. This is

11 2.7, you know, roughly.

12 　　　　ARBITRATOR FARMAKIDES: You said, as I

13 understood you, absolutely. I think that answers our

14 question, because we -- I have a couple of other

15 questions later on. I've read your testimony, and I

16 -- and so, but you just said in response to Judge

17 Wertheim's question that, absolutely, you're

18 suggesting that 146 times zero isn't going to add to

19 the equation.

20 　　　　THE WITNESS: No.

21 　　　　ARBITRATOR FARMAKIDES: It's just there

22 for informational purposes.

23 　　　　THE WITNESS: Just expositional.

24 　　　　ARBITRATOR FARMAKIDES: Thank you.

25 　　　　THE WITNESS: Yeah.

1   CHAIRPERSON JIGANTI: If there were one --

2   actually 146 zeroes, each of them ascribed a zero to

3   it, would it still be referred to as a weighted

4   average or would that just merely be the mean or

5   median? I guess median.

6   THE WITNESS: I'm not sure I heard the

7   question. Are you saying if -- if they had asked

8   everyone?

9   CHAIRPERSON JIGANTI: Yes, and they

10 actually said zero.

11   THE WITNESS: Actually said zero.

12   CHAIRPERSON JIGANTI: And would that still

13 be referred to as a weighted average, or would it be

14 just the average?

15   THE WITNESS: Well, it's a fact that any

16 -- you can write any average as a weighted average by

17 making a -- doing this kind of thing. So there

18 wouldn't be any particular reason to convert it into

19 a weighted average, because you probably wouldn't be

20 worrying about it. But if you wanted to, you could.

21   CHAIRPERSON JIGANTI: But if you didn't

22 want to, would it be -- could it -- you just refer to

23 it as an average?

24   THE WITNESS: Absolutely. This is just a

25 simple average.

BY MR. HESTER:

Q   And let me just follow up on that point, Dr. Fairley. If in the Bortz results these 146 cable operators had assigned a zero value, had actually been asked and had said they valued it at zero, would there be a basis for the automatic zero correction that you're making here?

A   No.

Q   Okay. Now, let me ask you --

ARBITRATOR WERTHEIM: Excuse me. Could I just go back to see if I can finally settle this in my own mind? You're applying your statistical formula that you would apply any time you got different results out of one subset than you got out of the total of the group being studied, is that correct?

THE WITNESS: You could, yeah.

ARBITRATOR WERTHEIM: Now, with that formula, if, for example, the respondents who did not have a public television distant signal had been assigned a one or a two, all right, you'd plug that number in where you now have a zero, and, of course, that would affect your results. But then you'd have an actual number you were working with. It's just coincidence that here the number that you get plugged into in that slot is a zero, because that's, in fact,

the value that was assigned.

        THE WITNESS: Absolutely. In fact --

        ARBITRATOR WERTHEIM: Is that correct?

        THE WITNESS: Yes, you're anticipating something I was going to say about Table 1. If you want to just turn to that --

        BY MR. HESTER:

Q   Let me keep it in sequence or we're --

A   Okay.

Q   -- all going to get lost --

A   All right.

Q   -- I'm afraid, or at least I'll get lost. Maybe everyone else won't, but let me just follow up on Judge Wertheim's point, though. If the survey respondents had automatically been assigned a one instead of a zero, among those who were not carrying a public television signal, you would still have a missing value problem, wouldn't you, because there wouldn't -- you would still be missing observations as to those who were not asked a question?

A   You're saying that they're not asked.

Q   They're not asked --

A   And that an automatic one is assigned.

Q   But an automatic one is assigned instead of an automatic zero. You would still have the

1   problem that you are addressing here of missing

2   values, correct?

3   A   Yes.

4   Q   And so the estimation technique you would

5   be applying here would still be pertinent no matter

6   what the arbitrary assigned value is, correct?

7   A   That's right, including if it were too

8   large.

9   Q   Is the missing value methodology based on

10   the fact that some respondents in the survey did not

11   give answers to the questions? Is that the reason for

12   the missing value methodology?

13   A   Some respondents were not asked the

14   question.

15   Q   As to public television programming?

16   A   Yes.

17   Q   Okay. Now, let me ask you to go to

18   Exhibit 38, please. What does Exhibit 38 reflect?

19   These are bar charts. Are these charts you prepared?

20   A   Yes.

21   Q   What does Exhibit 38 reflect? And let's

22   just focus on a year for purposes of illustration.

23   Let's focus on the first page for 1990. Could you

24   explain to the panel what this reflects?

25   A   Yes. This is showing, in a way that I

1 hope is -- hope itself will be the 22 out of the 27

2 respondents who gave a positive share to PBS when

3 responding. So starting at the left-hand side, one

4 respondent said three. So you -- then proceeding

5 along the next three respondents said five. The next

6 four said 10. When I say "next," it's just next in

7 the graph. I'm sure they weren't -- didn't answer in

8 this order. And then, one, two, three, four, five

9 said 15. Somebody said 17. Three said 20, and so

10 forth.

11   So it's -- it's just a -- a way to display

12 the distribution of the actual values of the

13 respondents.

14   Q   And is there some significance for

15 purposes of your analysis in this distribution of the

16 actual values that you see here for those who answered

17 the Bortz survey as to question 4?

18   A   Yes, there is, because what it shows is

19 for almost all of the respondents -- and this is true

20 of the other years, too -- when they carry PBS, it had

21 a reasonable share, for most of them, the great

22 majority of them, 10 or above.

23   Q   Now, in your answer in describing

24 Exhibit 38, I believe you had said that the first page

25 for 1990 reflected 22 of the 27 respondents, is that

1   right?

2   A   That's right.

3   Q   And when you're talking about respondents,

4   you're talking about cable operators that were, in

5   fact, carrying a distant signal, and so they responded

6   to question 4 on the Bortz survey. Is that what you

7   mean?

8   A   Yes.

9   Q   And are there some respondents who

10   reported a zero value, some respondents who were

11   carrying a public television signal who reported a

12   zero value?

13   A   Yes, there were in every year, and in this

14   year there were five.

15   Q   And could you explain how you interpret

16   those responses, zero values assigned by operators

17   that were actually carrying a distant public

18   television signal?

19   A   Well, at first sight it seems illogical

20   that they're carrying it, and they say that it's a

21   zero value. And I think the primary explanation is

22   one that we see in data collection almost everything,

23   and that's rounding. There is clear evidence in these

24   data of rounding to fives, or even perhaps tens, so

25   that most likely these are -- these were rounded down

1 to zero. They were positive but not large and rounded

2 to zero.

3 Q Rounded in the sense that when the

4 respondent was answering the questions he or she was

5 rounding and it -- rounding the answers to the nearest

6 five or the nearest ten. Is that what you mean?

7 A Yes.

8 Q Now, does that give you any concern about

9 the validity of the Bortz results, that you see this

10 sort of rounding?

11 A Not at all. As I mentioned, it --

12 virtually any time a data collector takes pencil to

13 paper you get -- you get some rounding. Either --

14 either the data collector with the pencil actually

15 rounds or -- or the person or the -- either the source

16 of the data is rounding in giving it to them.

17 So if -- if it were a serious problem, it

18 would be a serious problem for most empirical studies

19 in the sciences, social sciences, anywhere.

20 Q Now --

21 ARBITRATOR WERTHEIM: Excuse me. The very

22 first bar on the 1990 page is the share or value of

23 something less than five, is it not?

24 THE WITNESS: Yes. The rounding is not

25 universal. It's just a clear pattern. It's a

tendency. There's -- that's a three, and then over --

just to the left of the 15 on the horizontal axis

there is a 17. So some people were, you know,

evidently sitting there scratching their heads and

really fine-tuning this thing, but most respondents on

a telephone interview will not have -- most likely

have the patience to do that, and it's an uncalled for

precision. How can they tell if it's, you know, 17 or

15 or 20, really?

ARBITRATOR WERTHEIM: You're speaking now

of rounding by the respondents, not by the persons who

recorded the response?

THE WITNESS: Oh, yes. Yes. This is all

rounding by respondents.

BY MR. HESTER:

Q Now, when there's this sort of rounding by

the respondents, does it tend to become less of an

issue when you take an average across a broad number

of respondents? In other words, does the rounding

tend to drop out as an issue when you take an average

across a number of respondents?

A Yes. That's one of the reasons why

rounding is not -- is usually a negligible concern,

because you have rounding up as well as rounding down.

So you have people who maybe if -- if they spent a

1   couple of hours with this would come out with an

2   eight, but they say 10. So you've got it going both

3   ways.

4   Q   So when we average responses across a

5   number of respondents, is it a generally recognized

6   fact that you would -- this rounding issue that you've

7   identified would tend to drop out because of the

8   rounding going in both directions?

9   A   It does tend to. I'm sure there have been

10   some situations, of which I don't have a good example

11   for you, where rounding became -- is now a significant

12   issue. But I -- I don't see it as important here at

13   all.

14   Q   And you don't see it as -- do you see it

15   as something that affects the validity of the survey?

16   A   Not at all.

17   Q   Now, can you turn to Exhibit 40, please.

18   And could you explain, again focusing on the first

19   page of Exhibit 40 which deals with 1990, what this

20   reflects?

21   A   Yes, these were for the 22 respondents who

22   carried PTV as a distant signal and gave a positive

23   share. It shows those shares. That's in the fifth

24   program category over, of course, under PBS. You can

25   see the three there is I guess the seventh number

1 down, and the 17 we were talking about, and so forth.

2   Q   And the numbers on the far left of this

3 chart, what do those numbers reflect? They run one,

4 two, three, four, down to 22.

5   A   That's simply counting the number of

6 respondents giving a non-zero PBS value. It's just a

7 convenience in the table.

8   Q   So each line of data for the different

9 categories, does that reflect the survey responses

10 given by a given cable operator?

11   A   Exactly. So the -- row number one, that

12 cable operator respondent, to the relative value

13 question, 25 for movies, 15 for sports, 15 syndicated,

14 15 news, 20 PBS, 10 religious, zero Canadian.

15   Q   For a total of?

16   A   100 percent in every case.

17   Q   Now, responding to Judge Wertheim's point,

18 do you see, in looking at these data, a reflection of

19 the rounding that you had previously discussed?

20   A   You can see that clearly. There are very

21 few values that aren't rounded to a five, multiple of

22 five, or even ten for the higher numbers.

23   Q   And does the same point apply to 1991 and

24 1992?

25   A   Yes.

1   Q   Now, we had talked a few minutes ago about

2 the pattern of the survey responses as shown in the

3 bar charts in Exhibit 38. Does that pattern of

4 responses suggest that there is a threshold value that

5 must be exceeded before a system would decide to carry

6 a distant public television signal?

7   A   Yes, it does, the notion being that for

8 most of them until they get up to a value of around

9 10, they're not going to bring in this whole PTV

10 signal.

11   Q   When you say "a value of 10," you're

12 talking about a relative value as against other

13 programming categories, is that what you mean?

14   A   Yes.

15   Q   And why would you expect to see this sort

16 of a threshold effect?

17   A   I think the major reason, from my

18 understanding, is the opportunity cost, what I

19 understand to be a substantial opportunity cost to any

20 system operator bringing in a whole channel. And I

21 understand they think very carefully about doing that,

22 and they have a few of these distant channels to begin

23 with. I guess typically two, three, or four in a +-

24   Q   So that the cable operator has to make a

25 decision about carrying a whole separate distant

1   signal if it's going to bring in public television at

2   all?

3   A   That's right.

4   Q   And so is your point that that decision

5   would be subject to some sort of a threshold because

6   -- is that your point?

7   A   Yes.   I mean, the value certainly has to

8   be greater than the licensing fees. But they are

9   typically not -- not the biggest cost around. The

10   biggest cost is if you take PTV's signal, and that

11   means because of capacity constraints -- quite a few

12   of them have capacity constraints on their channels --

13   that means you can't take another channel that you

14   view as being worth 15 or 20, then you're not going to

15   take the PTV signal, because the opportunity cost of

16   taking it instead of that more valuable signal that

17   you could take is -- is too great.

18   Q   And that general phenomenon is why you

19   would expect to see a threshold effect?

20   A   Yes.

21   Q   Is the threshold effect important to the

22   ability to estimate missing values?

23   A   It -- I would say it's convenient. It's

24   essential. It's the way that I've done it. I

25   wouldn't say that if you didn't have it you couldn't

1   use some other method. I think what it does is, as

2   I'll explain in a moment, it enables you to use the

3   maximum amount of data that the survey provides that

4   is relevant to the question of what those missing

5   values really are. So I think it's the best way for

6   this data to approach it.

7   Q   So could you describe in general terms the

8   technique that you developed to estimate these missing

9   values?

10   A   Yes, and here let me start off -- it's

11   always a good place to start off with -- with the

12   goal, take a look at Table 1 in my testimony, just to

13   see what we're --

14   Q   This is Table 1 after page 9?

15   A   Yes. To see what the objective is

16   numerically and how it fits into the bottom line here,

17   the estimates. Column 1 shows the Bortz survey

18   estimates as published in their reports, and, of

19   course, averages in all of the automatic zeroes.

20   That's why they're -- they're as low as they are. The

21   next column shows average. We've seen this number

22   15.4 before. It's the average for the 27 of the

23   reported shares.

24   Q   When you say "share of queried," do you

25   mean those who were queried and who were asked to

1   provide a response to question 4?

2   A   That's right.

3   Q   For PBS?

4   A   For PBS, yes.

5   Q   Okay.

6   A   Now, if you'd just jump over for a moment

7   to column 4, this says, "Average estimated PBS share

8   of the non-queried." For 1990, those are the 146

9   systems that were not asked about PBS at all.

10   Q   So that's the objective that you're trying

11   to address through your methodology, to try to come up

12   with that number?

13   A   That's right, so 4.4 is the conclusion.

14   I'm just starting there to kind of fix ideas. And now

15   I can make the point that -- that I was before you

16   called me back from derailing the agenda and go to

17   column 3.   This says, "the adjusted PBS average

18   share," and that means it's an average share which

19   averages both the actual reported shares and estimated

20   missing shares. And you can see it's in between the

21   two numbers. It's less than --

22   Q   When you say "the two numbers," which

23   columns are you referring to?

24   A   Columns 2 and 4. So 6.1, which is the

25   adjusted average share estimate, is less than 15.4 in

column 2 and greater than 4.4 in column 4. And, in fact, it's -- you can view it as a weighted average of those two numbers.

ARBITRATOR WERTHEIM: How did you get the numbers that are in column 4? I've read your footnote, and I don't understand it.

THE WITNESS: That's going to take me a few minutes. That's what I'm --

ARBITRATOR WERTHEIM: Maybe you're going to get to that --

THE WITNESS: Yeah.

ARBITRATOR WERTHEIM: -- before it gets rather important here.

THE WITNESS: Yeah. This --

MR. HESTER: I'm afraid if we go out of sequence we may spiral into oblivion.

ARBITRATOR WERTHEIM: That's fine, as long as we cover it at some point.

MR. HESTER: Yeah, we will try to cover that.

THE WITNESS: Yeah. Okay. And just -- I don't know, it may be helpful. We're talking about -- you were talking about a hypothetical where Bortz -- people had substituted a one here, instead of a zero. And then this would be the formula for the weighted

average of the 146 ones and the 27 positives, or non-zeroes.

If you substitute, instead of zero or one, 4.4, which is the number in column 4, and carry out this arithmetic, then you get 6.1, or approximately 6.1, so that the 6.1 you can view as a weighted average of the observed shares and the estimated -- the average of observed shares and the average of the missing shares.

BY MR. HESTER:

Q   So is it fair to say that your technique is aimed at coming up with an estimate of the average share for the 146 respondents who were not asked to answer question 4 as to PBS?

A   That's correct. The objective, through estimating what the missing values are, is ultimately come to an answer in column 3 as to what the average PBS share would be if you asked -- if all 173 had been asked about PBS as well as the other five categories.

ARBITRATOR FARMAKIDES: How would you change that equation? If you had 140 who were missed, rather than 146, and six who said zero, who responded with zero, how would that change that equation?

THE WITNESS: 140 here?

ARBITRATOR FARMAKIDES: Yes, rather than

1   146, and then you had six who said zero.

2   THE WITNESS: Okay. So if we change this

3   to 140, and then -- so there will be six more, so we

4   have 33 over here now?

5   ARBITRATOR FARMAKIDES: Yes. But one of

6   those 33 -- oh, that would weight that down.

7   THE WITNESS: Yes.

8   ARBITRATOR WERTHEIM: You already have

9   five who said zero.

10   ARBITRATOR FARMAKIDES: I see.

11   THE WITNESS: Right.

12   ARBITRATOR FARMAKIDES: I see. I'm sorry.

13   THE WITNESS: Five of these numbers are

14   zero already, and that's included in here.

15   ARBITRATOR FARMAKIDES: I understand that.

16   BY MR. HESTER:

17   Q   But when you say "these numbers," are you

18   focusing on 1990? From among the 27 respondents we've

19   been talking about, five of those have a zero -- had

20   given a zero value, is that right?

21   A   That's right.

22   Q   And that those zero values that were

23   actually assigned are reflected in the 15.4 percent

24   average --

25   A   Yes.

1   Q   -- for 1990 among those who responded?

2   A   Yes, they are.

3   ARBITRATOR WERTHEIM: And you treat them

4   differently from the ones who were assigned a zero

5   because these five actually were asked and answered,

6   and their answer was zero?

7   THE WITNESS: Yes. So even though -- even

8   though I don't believe that, you know, that their real

9   value was zero, I don't change those because of what

10   I said before, that there is going to be some rounding

11   up as well as down so it mostly comes out in a wash.

12   ARBITRATOR WERTHEIM: All right.

13   BY MR. HESTER:

14   Q   So can you describe how you went about

15   this estimation of the missing values?

16   A   Yes.

17   Q   Do you have a pen?

18   A   Yes, I'm going to -- let me see, I --

19   Q   Use any color, but I had brought a black

20   one. I don't know what I did with it now.

21   A   I'm going to try to give you a picture of

22   what's going on here, because I think that's the best

23   way to understand it. I'll go through it. Please ask

24   any questions that anyone has.

25   It will be a graph, and the X axis is the

1   -- these are thresholds -- thresholds for systems to

2   carry PBS, and the Y axis up here is the PBS share,

3   both reported or -- or not reported -- that is, for

4   the queried and the non-queried. Now, if there is a

5   -- oh, let me put in the axes here. All right. I

6   have this written down so we can get it while -- this

7   is 10, 20, and 30 percent. 10, 20, 30. 10, 20, 30

8   percent. And --

9   Q   So you've drawn two axes with 10, 20, and

10   30 percent on the X axis for thresholds, and 10, 20,

11   and 30 percent on the Y axis for the PBS share. Is

12   that right?

13   A   That's right.

14   Q   The PBS share is what is often times

15   referred to as the value assigned to PBS by particular

16   cable operators, is that right?

17   A   Yes.

18   Q   Value in the Bortz survey, is that what

19   you mean --

20   A   Yes.

21   Q   -- by "the PBS share"?

22   A   Right.

23   Q   What do you mean by "the threshold"?

24   A   The threshold is the value for -- for a

25   given operator. It's the value that that operator has

1 to get above to take PBS.

2 Q In other words, for a given operator, if

3 the value is below some threshold, your point is he's

4 not going to carry it?

5 A That's right.

6 Q Would that threshold be different for

7 different operators?

8 A Yes. Different operators that were in

9 different markets, they have different audiences, they

10 have different constraints and have -- are severely

11 constrained by the number of channels that -- that the

12 networks, the government-mandated channels, and so

13 forth, that filled up their -- their menu. And so

14 they have very little room to maneuver. Others have

15 perhaps more capacity. So for a great variety of

16 reasons, the thresholds can vary.

17 Q Okay. Go ahead.

18 A And I'm going to draw here what I hope is

19 a 45-degree line to -- to indicate the nature of the

20 threshold. If -- let's say here is a -- here is a PBS

21 respondent -- excuse me -- a system respondent who

22 carried PTV signal, and they gave the answer 20 to the

23 survey, the interviewer. And I've drawn it -- put

24 this point here at 20 for Y, because that's the value

25 that they gave, and I've drawn it above five for the

1   X value. This is just a hypothetical. So the notion

2   is that for this operator their threshold is five.

3   Q   Meaning that if the value to the PBS

4   signal exceeded five they would carry it?

5   A   Right. Now, let's put in just some more

6   hypothetical values.

7   ARBITRATOR WERTHEIM: How would you arrive

8   at the five for the fellow who rated it a 20?

9   THE WITNESS: I'm glad you asked me that

10   question. That -- let me -- let me answer that in two

11   steps. The first step is if there is a positive PBS

12   signal, then by the nature of the threshold it has to

13   be above this 45-degree line, because this is -- this

14   is the line that divides the points in which Y is

15   greater than X from the points down here below it in

16   which X is greater than Y.

17   BY MR. HESTER:

18   Q   So your point is that for any cable

19   operator that reported a non-zero value for PBS, your

20   model is based on the proposition that that cable

21   operator's value exceeded his threshold for carrying

22   the signal?

23   A   That's right.

24   Q   And that's why all of the values actually

25   observed in the Bortz results exceed the thresholds

1   for those operators?

2   A   That's right. So a zero is a -- well, the

3   little zero that I've used here is a -- is a mark for

4   the -- the 22 operators in 1990. I'm just -- let's

5   imagine this is 1990 -- who gave a non-zero response

6   to the interviewer. This is what I'll call a non-zero

7   PBS system.   That   is   to   say,   it's   describing

8   hypothetically a system operator that gave this answer

9   -- the vertical value of this point being the answer

10   they gave to the interviewer.

11   And how can we plot these points?   I'm

12   sure you're wondering, because we don't -- where are

13   the measurements of these thresholds? Who knows them?

14   Okay?   And   the   first   answer   is   this   is   purely

15   hypothetical, and I'm inviting you to -- to agree with

16   me   that   if   there   is   a   threshold   then   these

17   observations have to be above it. That's clear.

18   But they could be all over here, they

19   could be all over here -- I mean, that isn't clear

20   yet. I'm just -- these points are, from that point of

21   view, just hypothetical. Their location -- it has to

22   be up here.

23   Q   Above the 45-degree line?

24   A   It has to be above the 45-degree line.

25   This is the -- this is the line where Y equals X. In

other words, where the threshold just exactly equals

the share, so that would be the tipping point. If

your -- if your threshold were 10, then presumably

you're not going to say the value is five. I mean,

that's the idea. You will not. The threshold is 10,

so you -- it's got to be up here somewhere.

Now, how do we -- how do we go from here

-- how do we get -- get somewhere from here? Well,

we're going to go now to all 173 system operators in

the survey. And notice that -- take a look again at

Exhibit 40. Those were the tables of shares. Look at

the first table for 1990.

And we're going to consider for each vote

-- that is, for each operator -- what the minimum

value is reported for that operator. So for operator

number 1, the minimum value reported is a 10 for

religious. For operator number 2, the minimum is a

five for religious. Let's find some others. Well,

for operator 10, news and religious -- the minimum

value, they happen to be tied at 10.

Q   And for operator 3, the minimum value

would be five for PBS?

A   Operator 3? That's right. So that's the

minimum.

ARBITRATOR WERTHEIM: Why didn't you look

1   at all 27 for this purpose? Because they would have

2   reported values for all of the other program

3   categories.

4   THE WITNESS: I'm sorry. I don't --

5   ARBITRATOR WERTHEIM: If you're only

6   looking to this table, at the 22 --

7   THE WITNESS: That's right.

8   ARBITRATOR WERTHEIM: -- who gave a non-

9   zero value to PBS --

10   THE WITNESS: That's right.

11   ARBITRATOR WERTHEIM: -- why aren't you

12 looking at the total of 27, including the five who may

13 have given PBS a non-zero, but they also gave some

14 value to these other categories, which might give you

15 more data than --

16   THE WITNESS: Well --

17   ARBITRATOR WERTHEIM: -- for the question

18 you're addressing.

19   THE WITNESS: -- in fact, I looked at all

20 of the rest of the -- the values, not just those five

21 that gave zero, but everybody else as well.

22   ARBITRATOR WERTHEIM: Oh, okay.

23   THE WITNESS: So --

24   ARBITRATOR WERTHEIM: That's what you're

25 saying, you looked only at those shown in this

1   exhibit.

2   THE WITNESS: No.

3   BY MR. HESTER:

4   Q   What you're doing, Dr. Fairley, at this

5   stage is illustrating how you would come up with the

6   estimated thresholds for the 22 non-zero respondents,

7   is that what you're doing at this stage?

8   A   Actually, where I'm headed is -- is

9   talking about thresholds for all 173.

10   Q   Okay.

11   A   All -- we do have some information about

12   the thresholds for the -- the 22. That is, that they

13   have to be somewhere above this -- this line. But

14   what -- imagine here in Exhibit 40 that this table is

15   extended to have 173 rows, and that we have the

16   shares, as of course I did, obtained from Bortz and

17   Company, the shares fill in for all 173 operators for

18   all categories where, of course, 146 of these had an

19   automatic zero for PBS in Canada.

20   And now we -- we do the same thing. In

21   fact, for each operator, we find the minimum non-zero

22   value that they reported. For each operator, we're

23   going to have -- you can imagine another column here

24   in this table where you record the minimum non-zero

25   value for that row. And let me -- let me show you

1   what those minimums were.

2   I'm going to call this, just for

3   convenience -- what you're doing is putting into

4   another chart. I'm going to call this Chart 1, the

5   one we just did, and I'm going to call the next chart

6   Chart 2. Now, I'm going to show you what the values

7   and the frequencies of these minimum values are for

8   all 173. So we have here on the X axis -- and these

9   are going to be a kind of threshold, but they are a

10   threshold for -- not for bringing in a whole channel

11   but for bringing in a program category.

12   So down here we'll -- I compile these in

13   terms of the following classes -- values from one to

14   nine, values from 10 to 19, 20 to 29, 30 to 39, and --

15   and some others. And then I'll mark off here out of

16   173, for 1990, 20, 40 --

17   CHAIRPERSON JIGANTI: Doctor, would it

18   disturb the flow too much if we took a recess at this

19   time?

20   THE WITNESS: I don't think so.

21   CHAIRPERSON JIGANTI: Okay. We'll take a

22   10-minute recess.

23   (Whereupon, the proceedings were off the

24   record from 3:51 p.m. until 4:04 p.m.)

25   CHAIRPERSON JIGANTI: Okay, Doctor.

BY MR. HESTER:

Q   Dr. Fairley, have you had a chance to finish the second chart that you were preparing when we took the break?

A   Yes, I did. And what I've done is to -- first of all, I've put in some -- some pluses here. They're intended to be -- to be pluses.

ARBITRATOR WERTHEIM: This is on your first chart?

THE WITNESS: The first chart, Chart 1, which are points below the 45-degree line. And these correspond to the missing shares. So here is a -- most of them are down here. Of course, I can't show them all, but they are -- both of them are down here below five. And then there are some others that -- that tail up to -- to virtually any value.

BY MR. HESTER:

Q   And this is a hypothetical --

A   This is a hypothetical display of points. And for these points, it's -- it's completely hypothetical in that by assumption we haven't observed these shares. They weren't asked. And so the picture is intended to be an artist's rendition of what the graph would look like had they been asked. But -- and I've drawn it, of course, to try to illustrate the

1   method.

2   But you have to imagine that, you know,

3   there -- that on the one hand they are really -- they

4   are answers to -- I shouldn't say real hypothetical

5   questions.

6   Q   Well, so in other words this -- is this

7   just a general rendition of the way one would approach

8   a problem of missing values? You know some values,

9   and you don't know others, and you try to figure out

10   what the -- what the whole plot would look like.

11   That's what the technique is designed to do?

12   A   That's right. And now I think I can

13   fairly quickly move to show you just what is involved

14   in the technique, at least as an overview, and we can

15   come back to specific questions on it.

16   But just one more detail point on this

17   graph. We can now say that -- show how these points

18   can actually be plotted if you assign to a system

19   operator who gave a positive response on PBS their

20   minimum value, so that's how these are plotted. So --

21   Q   When you say "these," you're referring to

22   those respondents who gave non-zero values?

23   A   That's right. So, for example, here is --

24   here is a respondent who gave 15, one of the 15 value

25   respondents. And it's -- it's drawn to say that the

1   minimum value in their row was five. And I don't know

2   if that's an actual point for 1990. We could plot an

3   actual point just to be absolutely clear about this.

4   Say operator number 1, their minimum was

5   10 and PBS share was 20. So we have Y is 20 and --

6   Q   X is 10. So that's an actual plot you

7   would make of an actual data point.

8   A   Yeah. So this would be the point --

9   ARBITRATOR WERTHEIM: So you're, in

10   effect, assigning to them a threshold that's equal to

11   the lowest value that they gave to any program

12   category.

13   THE WITNESS: Exactly. That's what I'm

14   doing. There's going to be one further shift in that,

15   but that's what I'm doing now. So this is that

16   operator number 1 right here. Y is 20, and X is 10.

17   And then I put along the horizontal axis

18   -- I have depicted those minimum values for all 173

19   respondents, and --

20   BY MR. HESTER:

21   Q   The minimum values in that sense being the

22   lowest non-zero value that any respondent reported in

23   the Bortz survey for 1990?

24   A   Yes, for each respondent their lowest

25   response value, their minimum value. And so we plot

1   those here, and we know those, of course, because we

2   had the table. We've got the column of the minimum

3   values, so we have 173 numbers. And these are 173

4   minimum values. We plot them right here, just take

5   off the points on the X axis to indicate where they

6   fall.

7   Q   And these numbers are taken right out of

8   the Bortz survey?

9   A   Right out of the Bortz survey. And I've

10 tried to draw it to indicate that they are bunched up

11 as they are, as you'll see in a minute, down near --

12 near zero, and then they trail off. Perhaps it

13 doesn't show that they trail off as much as they do,

14 but there -- there are really just a handful of points

15 out here, handful of operators who -- who had a

16 minimum as high as 30.

17   Now, I'm going to go to Chart 2 we were

18 looking at, and here's the -- the actual distribution.

19 The solid line is the actual -- the actual frequency

20 count of the minimums of the thresholds. I'm going to

21 call them the mins. of the thresholds, and that's why

22 I've drawn -- why I've called this X, because it's the

23 same as before -- X is the threshold, and then these

24 are the categories in which I've grouped the 173

25 values.

1   Q   So let's just take the example of the

2   first one, the solid line under one through nine.

3   What does that reflect?

4   A   That reflects that there were about 80 --

5   I'm rounding just to illustrate here -- for 1990. But

6   all three years they were --

7   Q   There were about --

8   A   -- very similar.

9   Q   There were about 80 respondents who gave

10   a minimum value between one and nine?

11   A   That's right. Eighty respondents had a

12   minimum value in their row between one and nine, most

13   of them, of course, being fives. And that's out of

14   173 if you want to take 1990 as -- as the example.

15   Then the solid line here is the same thing

16   for the next solid line over to the right in the graph

17   -- the solid line for the category of minimums or

18   thresholds between 10 and 19. And this shows that

19   there were about 60 operators whose minimum values in

20   their rows were between 10 and 19, most of those being

21   10's and 15's because of the rounding.

22   And then here, for 20 to 29, I've drawn

23   this a little too high because that doesn't leave

24   enough for the others. But as drawn, it shows about

25   20 of them.

1   Q   So what do the dotted lines reflect now?

2   A   Okay. Now, we come -- these are -- these

3   are model fitted lines, but I want to go back to

4   Chart 1 just before -- well, no, I'll stick with this.

5   In statistics, it's very useful for a number of

6   reasons to create simpler descriptions of the data.

7   And these are -- these are called models, and they

8   follow certain standard mathematical forms.

9   When I was in graduate school I learned

10   one thing after another, and after a few weeks I was

11   bewildered and I said, "Gee, will I never get to the

12   end of these standard models?" But then a few months

13   later I realized there were only 10 or, you know, 15,

14   or there aren't that many but they seemed like a lot

15   when you first confront them.

16   Anyway, we looked here at -- I looked at

17   -- at the standard models that provide simple

18   descriptions for what's called discrete data. That's

19   data that is -- has values one, two, three, four,

20   five, six, to 10, 15, and so forth.

21   Q   So you're coming up with a model that

22   would provide the closest fit to the data that have

23   actually been observed?

24   A   That's right. We want a good-fitting

25   model, or we'll say a reasonable-fitting model. And

1   I tried different models. My first thought was the

2   Poisson, and then I went to the so-called negative

3   binomial and ended up as the best-fitting model in

4   this scheme was a model called the geometric, and I

5   plotted here the probabilities for this model. Now,

6   these are probabilities under this particular

7   simplified description of frequencies.

8   Q   So the dotted lines are meant to show what

9   the geometric model would predict and show how you fit

10   the geometric model to the data?

11   A   That's right. It's the -- in fact, it's

12   the geometric model whose mean is -- I think it's

13   10.8. And if you look in -- again, at Table 1 in my

14   testimony, column 8, over in -- say, for 1990, you see

15   the value of 10.8. That's the estimated threshold.

16   Q   So you've derived the estimated threshold

17   as an average across all of the respondents?

18   A   Yes, the 10.8 is an average estimated

19   threshold because they differ. So you have 173

20   different thresholds. Some of them have the same

21   value, but there are 173 thresholds. And their

22   average, as estimated in the model that I fit, is

23   10.8. That's what that means. And so the average of

24   these dotted line frequencies is 10.8.

25   Q   And that's meant to be a close fit to the

1   actual Bortz survey data?

2   A   Yes. Now, you're probably observing that

3   maybe it's -- it certainly has the right shape,

4   doesn't it? That the -- the actual frequencies are

5   such that in the first category you have most of the

6   values, or more -- the largest number. And in the

7   next category of thresholds you have a smaller number,

8   and then it drops off rapidly.

9   So the geometric has that same property

10   that the -- the frequencies are always going down. So

11   that's fine.

12   You'll look here -- this -- this may not

13   appear so great. The first one here is a little too

14   large, and the second one is a little too small, isn't

15   it? The dotted line is --

16   Q   You're talking about the dotted line?

17   A   It didn't quite reach the solid line's

18   height over in the second category. But in the first

19   category of threshold values, the reverse is true.

20   The dotted line overshoots -- predicted 100 of these

21   but there are only 80, in fact.

22   Well, in this context, I determined that's

23   not an important deviation. A model is always a

24   simplified version of reality. You don't expect --

25   you can't expect that you're going to get a perfect

1   fit. The real issue becomes, for any model-fitting

2   exercise, are the departures of the model from the

3   observed data so important and in such a direction

4   that they're going to seriously mislead?

5   In particular, we're here to estimate the

6   average share for all 173 as they've been asked. And

7   so the question comes down to, if we use this model,

8   will we get a biased estimated of that average share?

9   The answer is not very much, and the direction is

10 important. We will get a slight -- somewhat of an

11 underestimate from this.

12   Q   When you say "an underestimate," do you

13 mean an underestimate of the adjusted PBS share?

14   A   That's   right.   So   it's   a   slight

15 underestimate, maybe on the order of .2 to .5,

16 somewhere in there, because this model doesn't fit

17 better. So it's a cost of using this model. It's --

18 you know, you might go on and try to estimate those

19 and then adjust your estimates for that, but I haven't

20 done that.

21   ARBITRATOR WERTHEIM: And that's because

22 primarily in the one to nine threshold category your

23 model has a lot more projected respondents than the

24 actual data available?

25   THE   WITNESS: That's   right.   It's

1   overshooting this, so you're getting more low

2   thresholds than there really are.

3   ARBITRATOR WERTHEIM: So you're suggesting

4   that, in fact, the -- that probably some of those

5   reported in this model as one to nine, or projected as

6   one to nine, are more likely 10 to 19. But to stick

7   with the model, you don't make that adjustment?

8   THE WITNESS: That's right. It's very

9   hard to -- you know, you can't just pick and choose.

10   You try to create a model that's faithful on several

11   dimensions of the data, and we can't just go, you

12   know, monkeying with this part, and that part, and

13   that part. Pretty soon you don't know what you have,

14   so --

15   ARBITRATOR WERTHEIM: That's called final

16   determination.

17   (Laughter.)

18   THE WITNESS: Fudging I think in the

19   engineering literature.

20   (Laughter.)

21   Fudge factors.

22   So, yeah, you can see that if you -- if

23   you took this piece of the frequency, this

24   probability, and spread it over these, you're going to

25   get a higher threshold. And if you have a higher

1 threshold, it's important to note you'll get a higher

2 estimated value because --

3   BY MR. HESTER:

4   Q   Higher estimated value for PBS?

5   A   For PBS, for the actual share.

6   ARBITRATOR FARMAKIDES: Have   we

7 established that, in fact, you reviewed the Bortz

8 survey, you're fairly in agreement with it except for

9 the adjusted values that you calculate? Is that your

10 opinion?

11   THE WITNESS: Yes.   The -- I can go

12 through -- I've gone through -- I have a checklist

13 that I use for surveys. I could go through that

14 quickly with you, if you want.

15   ARBITRATOR FARMAKIDES: No. I just wanted

16 to know your opinion, that you agree with the Bortz

17 survey as a tool to be used for measuring what it

18 measured, and but for the adjustment that you cranked

19 in, why you would go along with it.

20   THE WITNESS: I would, yes. It's -- it

21 seems to be a well-designed, well-executed survey. I

22 don't have any other major problem with it.

23   ARBITRATOR FARMAKIDES: Thank you.

24   THE WITNESS: So another way to picture

25 this model, if it's any clearer for you, is you could

1   draw a smooth curve here, and that would -- I have

2   indicated how the frequencies for the model decrease

3   and how it fits the observed data.   But this is

4   probably a more concrete way to think about it.

5   So we now have one of -- one of the

6   building blocks of the model, which is this geometric

7   distribution fitted to these threshold data. Now I'm

8   going to go back to Chart 1 and talk about the other

9   pieces of the model. So we have -- we have -- on this

10   axis we have a model for how these values are

11   distributed.

12   BY MR. HESTER:

13   Q   When you say "these values," the threshold

14   values?

15   A   The threshold values are distributed.

16   Now, I'm not going to --

17   Q   And that distribution is based on the

18   Chart 2 modeling that you've just been discussing?

19   A   That's right.

20   Q   Okay.

21   A   Now, by a related logic but it gets more

22   complicated, we also discovered that the geometric

23   model fitted well the PBS share values.

24   Q   The share values that had actually been

25   reported by those who gave a non-zero value?

1   A   That's right, and the Y values. And --

2   Q   And did that confirm, generally, the

3 decision to use the geometric model here? The fact

4 that you were able --

5   A   Yes.

6   Q   -- to fit it to the reported values in the

7 survey?

8   A   Yes. So these thresholds are, of course,

9 data from the survey. They are reported values in the

10 survey. These shares are the more important values in

11 the survey from our point of view. These are the

12 actual shares reported.

13   So we have a -- we have a model

14 description for the Y's and for the X's. There's only

15 one thing missing. How does X and -- how do the X's

16 and Y's relate to each other?

17   Q   Well, and you also have -- you have

18 threshold values and share values for 22 of the

19 respondents, correct?

20   A   Yes.

21   Q   So what you're really missing are share

22 values for certain of the respondents as to whom you

23 have the threshold values?

24   A   That's right. In a sense, we have three

25 out of four pieces of the data. We have X and Y for

1   PBS; we have X for -- for the non-PBS -- that is, the

2   146. So the only thing we're missing are the Y's for

3   these 146. We've got three out of the four.

4   And as I was saying, the missing -- the

5   only other thing we need now is to describe in a model

6   form how these frequencies applied to the regions of

7   X and Y. That is, is there -- is there a lot of

8   probability up here, but not here or here? And so

9   forth. This may be a little abstract, but let me say

10   that the -- what we did was to start with the -- what

11   is a benchmark model for what that relationship is,

12   and that's -- I can call it the pro rata model, or

13   it's called technically the independence model, the

14   relation of X and Y.

15   That simply says that if, say, you had 20

16   values between one and nine in the first category for

17   X, and then let's say there were 10 -- 10 of the 22

18   were between one and nine for the observed share

19   values, so you have -- actually, 20 is much too small.

20   Q   What you are trying to do is develop a

21   model for working with the threshold values you

22   observed and figuring out what probability would lead

23   to the most -- the probability estimates of getting

24   certain values for PBS, is that the way you were doing

25   it?

1   A   Yes. We were trying to get -- to complete

2   the model, we need probabilities for where these

3   points are. We have probabilities for X alone and for

4   Y alone, but that doesn't tell us where -- where these

5   points in particular -- I don't know how -- how to say

6   this.

7   Q   In general terms, Dr. Fairley, is it fair

8   to say that there is a recognized method for modeling

9   this? Given the data observations that you had, you

10   were able to apply a standard model?

11   A   Yes. I applied the standard model, pro

12   rata model, and said the -- the Y values you have are

13   just pro rated. You take the number of points here

14   and just pro rate them, take the X points here, say

15   there are 80 of them, and you pro rate them to the

16   categories for Y's, in proportion to the frequencies

17   of the Y's.

18   So if there are -- if half of the X points

19   are in this lowest category, and you have a third of

20   the Y points here, then a half times a third is a

21   sixth, and your model is that one-sixth of all of the

22   XY points are in this square, and so forth.

23   Now, in addition to simply using the

24   benchmark model, I have noted -- I looked at the

25   actual distribution of the points. They don't

1   contradict that model. They are in reasonable

2   agreement with it. So it was a -- I thought, a

3   reasonable thing to do. Plus, finally, you do what's

4   called some sensitivity analyses.

5   Suppose that they weren't exactly

6   independent, and small values of thresholds tended to

7   go with small values of shares, and large values with

8   large values, or vice versa, small values of the

9   shares went with large values of Y's. That would be

10 a negative dependence or correlation.

11   So if you look at either some -- the

12 ranges of plausible positive or negative correlation,

13 again it doesn't change the answer very much. So this

14 is not an assumption that is -- to which the answer is

15 very sensitive.

16   Q   So can you generalize that what you are

17 doing here was an estimation technique based on a

18 probability model for estimating the missing share

19 values?

20   A   Yes, we have fitted a probability model to

21 the XY combinations using standard components, and we

22 have --

23   Q   And --

24   A   -- those fitted values then become the

25 estimates.

1   Q   And does that probability model conform

2   well with the actual observations that you have -- in

3   other words, the share values that you do see in the

4   study?

5   A   Yes. They are used to -- to develop the

6   actual values in the models. That is, the geometric

7   model is nothing without actual values. So we have

8   not just taken a geometric model; we have taken a

9   particular geometric model that we fitted to the data.

10   So --

11   Q   So you haven't made up an abstract model

12   here, have you? Is that right? You've based it on

13   the actual survey results that you see?

14   A   Yes. The forms of the model are -- are

15   suggested by the type of data and experience with

16   these types of models, but then you don't stop there.

17   You -- in fact, we fitted -- we fitted several models

18   that fully -- we got the -- the best -- best-fitting

19   one. So we fitted a model to the -- to the actual

20   data, and --

21   Q   And does that lead to a maximum likelihood

22   estimation of what the missing values are?

23   A   Yes. And the maximum likelihood

24   estimation is the particular method by which you get

25   the fit. What it refers to is technique for choosing

1   those values, in particular what -- the unknown value

2   here is the average share for PBS over all 173.

3   That's -- that's what we're driving at. That's the

4   unknown value, because if we have that that's the

5   answer. That's the answer we're looking for.

6   So the maximum likelihood technique, if I

7   could ask you to turn to Exhibit 39, is the most

8   common statistical estimation technique. It has the

9   property that -- it says the -- you pick the estimate

10   that makes the actual observed data most likely.

11   Q   So in other words, in this case you have

12   a number of observed data points, correct?

13   A   Yes.

14   Q   And what you're trying to do with the

15   estimation technique is come up with an estimate for

16   the missing values that would make the observed data

17   points most likely?

18   A   That's right. We actually come up -- we

19   don't really have to estimate each of those missing

20   values. We simply -- all we need is the mean.

21   Q   Because you're trying to come up with a

22   mean of all of the missing values.

23   A   That's right. So that's the objective is

24   to find that mean. And --

25   Q   Now, are the results of the estimation

1   that you've undertaken set forth in Table 1?

2   A   Yes.

3   Q   And could you just describe briefly what

4   each of the columns reflects based on what we've been

5   discussing?

6   A   Okay.   Column 1 is -- these are the

7   reported Bortz survey estimates, including the

8   automatic zeroes and the averages, so that they are as

9   low as they are.   Column 2 we went through -- is the

10   average of the shares for all respondents in each year

11   who carried PBS -- PTV distant signal.   Column 3 --

12   this is the bottom line.   These are the results of the

13   model fitting by maximum likelihood.   This is the

14   estimated average on this axis, the Y axis, PBS share.

15   So you fit the model and then you find

16   that 6.1 plus the items down here, because almost all

17   of the points -- although it isn't as obvious in -- in

18   the graph, almost all of the points are down here.

19   Q   The missing points, you're talking about?

20   A   Yes.

21   ARBITRATOR WERTHEIM: Could we go back

22   just a moment to when you were describing your pro

23   rata model for rating the Y axis, the PBS shares? Did

24   I understand you did that for what we'll call, what do

25   you want to call it, your plus respondents, the ones

1 who were non-queried, and in proportion to the

2 frequencies of the shares reported by the respondents

3 who were queried?

4 THE WITNESS: I may have misspoke here.

5 Perhaps -- let me just take a moment. I prepared a

6 table just to illustrate that. I think I can put it

7 up quickly to clarify. The pro rata example really --

8 you have 173 here and 173 here, and I think I may have

9 misspoken in just talking about -- talked about having

10 22 here. Is that what you were thinking of?

11 ARBITRATOR WERTHEIM: Well, I'm not sure.

12 I just didn't -- you said it was to be in proportion

13 to the frequencies of Y's, but you didn't say whose

14 Y's.

15 THE WITNESS: Okay. All of the Y's, both

16 the missing and the observed.

17 ARBITRATOR WERTHEIM: But you didn't have

18 the Y's for the missing, right?

19 THE WITNESS: Well, it --

20 ARBITRATOR WERTHEIM: That's what we're

21 trying to estimate, isn't it?

22 THE WITNESS: That was the -- the second

23 step is, as part of the model -- you're correct. We

24 don't have those until we fit the whole model and get

25 at the maximum likelihood estimate. And then, that --

1   that estimate is the mean of the geometric

2   distribution for the Y's.

3   So now that's where we can get the

4   frequencies of Y's in any given interval. It's after

5   we fit the model, then we have a model-fitted

6   prediction for how many Y's there are one to nine, how

7   many are 10 to 19, and so forth.

8   BY MR. HESTER:

9   Q   The first step in the model is to look at

10   the relationship between the Y value and the X value

11   for the 22 who had actually provided a response, is

12   that the first step to begin this pro rata adjustment?

13   Or pro rata model, I'm sorry.

14   A   Did you say to look at them?

15   Q   Well, in other words, do you begin, in

16   response to Judge Wertheim's point, that you don't

17   know the Y values for the non-queried respondents, do

18   you begin by looking at the relationship between the

19   Y and the X values for those who actually did give a

20   response?

21   A   Yes, that's the way I --

22   Q   That's the way you begin developing the

23   probability model?

24   A   Yes. Now, you start out, as I started out

25   in explaining this, without the X's and I drew in

1 these -- these circles. Then later I explained that

2 the way you get the X's for the circles is -- is the

3 minimum for each operator over the row. And so that's

4 -- that's how we can actually plot these points.

5 And then we have the X's for the missing

6 values, but we don't have the Y's. It's at that point

7 that we must go to fitting the model. We have a

8 reasonable fit here for the X's. We have reason to

9 think the Y fit will also be geometric, and we have

10 reason to think that this pro rata relationship of X

11 and Y occurs. So that completes the model, and we can

12 now write it down as a formula.

13 ARBITRATOR WERTHEIM: Well, it was the pro

14 rata model that I was stuck on, how you derived that.

15 THE WITNESS: Okay. It's -- I can explain

16 that --

17 ARBITRATOR WERTHEIM: Or if you'd prefer

18 to come back to this later that's fine, because I know

19 Mr. Hester is taking you through your table.

20 BY MR. HESTER:

21 Q   Well, maybe we should go to this -- this

22 pro rata model. I wasn't planning to go back to it,

23 so maybe we should go on. Let's deal with that right

24 now, sure.

25 A   Okay. Let me show you Chart 3 here. And

1 this is just a toy illustration of the meaning of the

2 pro rata assumption in the model. And we have,

3 imagine here, the Y axis and the X axis as before; the

4 categories are the same, one to nine, 10 to 19, 20 to

5 29, so forth; one to nine here, 10 to 19 here on the

6 X axis as well, and so forth.

7   Now, let's imagine -- here are some

8 hypothetical frequency distributions for the values of

9 X and for the values of Y's. Let's say that there --

10 in one year, contrary to fact there were 150

11 respondents, and 75 of them had threshold X values

12 between one and nine, 37 -- or in other words, just

13 about half of 75 had threshold values between 10 and

14 19, 17 were in the next category, and 18 were in the

15 -- in that category, and that -- that's it. That

16 approximately adds up to 150.

17   And then on the Y side -- and, of course,

18 when you start out you don't know these numbers. But

19 I'm trying to illustrate the concept of this pro rata

20 relationship. But let's say you had 100 Y's between

21 one and nine, you had 25 in the next category, and 25

22 in the next, adding up to 150. Okay. Well, we can do

23 some -- some arithmetic here.

24   Seventy-five is one-half of 150. I'm

25 sorry I'm blocking some of you. Seventy-five is half

1   of 150, so I'm going to put -- put the half down here.

2   Thirty-seven is half of that, or about a quarter. A

3   half again of 37 gives us an eighth here and an eighth

4   here for 18, rounding. You know, 100 is two-thirds of

5   150, so we'll put the two-thirds here for the Y value.

6   And 25 is a sixth of 150, so we'll put one-sixth in

7   each of those.

8   So we have the relative frequencies here,

9   which, of course, add up to one -- one-sixth plus one-

10   sixth plus two-thirds for the Y values, and then the

11   relative frequencies for the X values also add up to

12   one.

13   And now we say, okay, how many XY

14   combinations do we have in this box where X and Y are

15   both between one and nine? Well, pro rata you just

16   say, well, you've got 100 here, and so -- and half of

17   them are going to be in here. You've got 25 here, and

18   half of them are going to be in here -- about 12.

19   You've got 25 here, and half of them are going to be

20   in here, let's say 13.

21   Q   So you've just gone through the first

22   column, going up the Y axis where the X axis shows a

23   number of 75, and you've spread that X axis along the

24   Y axis according to the proportions you had laid out,

25   correct?

1   A   Exactly. So these numbers in the body of

2   the table are determined by multiplying the frequency

3   -- the relative frequency for the first X category

4   times the totals for each row along the Y dimension.

5   Q   Okay.

6   ARBITRATOR WERTHEIM: So you're saying you

7   don't need to be any more precise than that because in

8   the end all you're looking for is an average anyway.

9   THE WITNESS: Let's see, I'm not sure I

10   understand the way your question is coming from.

11   Here, of course, I don't need to be precise because

12   it's just a toy illustration.

13   BY MR. HESTER:

14   Q   Well, I think what Judge Wertheim is

15   asking is in relation to the final effort to fit the

16   model to the data, how precise do you need to be in

17   terms of -- in terms of estimating individual points?

18   A   Certainly, we don't need to actually

19   estimate these. We don't actually do that.

20   ARBITRATOR WERTHEIM: I mean, it's good

21   enough to know, for example, that you have -- your

22   formula produces or your model produces 50 in the

23   category of one to nine, and you don't need to know

24   any more specifically than that as to how many might

25   come out of two, or three, or four, or somewhere in

1   between one and nine.

2   THE WITNESS: Oh, I see. Oh, down here.

3   Yes.

4   ARBITRATOR WERTHEIM: You just took half

5   of 100 and you got 50, and that's good enough for this

6   purpose?

7   THE WITNESS: Yes. In actuality, when you

8   fit the model you have a lot more detail, because this

9   geometric distribution which describes the X and the

10   Y has frequencies on every positive number -- one,

11   two, three, four, five, six, up to, you know,

12   indefinite. And what that means is it's just an

13   approximation. The actual data are clumped, as we

14   know, mostly 5's, 10's, 15's, and 20's. That doesn't

15   matter. It's -- it's a -- it's a kind of

16   approximation that works.

17   ARBITRATOR WERTHEIM: Okay. Thank you

18   very much.

19   Sorry if I've --

20   MR. HESTER: That's all right. Does the

21   panel have any more questions? I know we could spend

22   probably several weeks of statistics courses on this.

23   Does the panel have any more questions on the

24   generality of the technique? Because I would propose

25   now to just go quickly over the Table 1 results and

1   turn it over at that point.

2   BY MR. HESTER:

3   Q   Okay. Dr. Fairley, if you could just go

4   back to Table 1.

5   A   Okay. I was at --

6   Q   We've talked about Columns 1 and 2. Is

7   Column 3 what was actually estimated through your

8   estimation technique?

9   A   That's right.

10   Q   And so those are the results that were

11   derived from the estimation technique you've been

12   describing?

13   A   Yes.

14   Q   And how do you get to column 4, which

15   shows the average estimated PBS share for the non-

16   queried cable operators?

17   A   Well, in fact, you back that out of

18   columns 2 and 3, because column 3 you know must be a

19   weighted average of column 2 and 4. So you know now

20   the values in column 2 and the values in column 3,

21   because they've just been estimated. And so now the

22   only unknown in the equation for the weighted average

23   is -- is the average share of the non-queried.

24   Q   So in column 4, that's really derived as

25   a matter of algebra from the estimates you developed

1   for column 3?

2   A   That's right. So you see here implicitly

3   what is being estimated. Implicitly, the -- you know,

4   the -- you're saying the result is that the estimate

5   -- the average missing value is -- for 1990 is 4.4.

6   That would be the average response if you ask people.

7   Q   And in contrast, the average that you show

8   in that year for those who were asked was what?

9   A   15.4.

10   Q   And in general terms, can you summarize

11   what you have done here in terms of taking the Bortz

12   results   that   were   actually   reported   in   deriving

13   missing values? Have you based these estimates on the

14   actual survey results?

15   A   Yes. They are -- they are based squarely

16   on the actual survey results.   Without them, you

17   couldn't get these estimates at all. And while this

18   is perhaps -- seems this may be a novel exercise to

19   you, but, in fact, these estimates are every bit as

20   legitimate, as valid, as worthy of consideration as

21   any statistical estimates.

22   So   the   15.4,   of   course,   is   only   an

23   estimate. 2.7 is an estimate. These are all based on

24   uncertainty of one kind of another.

25   Q   Now, what you have ended up here -- ended

1 up with here is an estimate for PBS based on

2 recognized standard statistical techniques, is that

3 right?

4   A   Yes.

5   Q   Are the techniques that you've been

6 describing here quite familiar to statisticians?

7   A   Yes. As in each of the cases assumed

8 here, I mean pride of authorship requires me to say I

9 think this is a nice application and -- in my mind.

10 So, you know, I think I've put some of the pieces

11 together in a -- in the appropriate way to -- to

12 customize the standard pieces to this problem.

13   Q   Now, are these results, in your judgment,

14 likely conservative as an estimate of the adjusted PBS

15 average share?

16   A   Well, in fact, yes, I think they are, not

17 primarily for the reason we were talking about before,

18 which was that the geometric fit to the X values, as

19 you'll recall, was overshot a little bit on the low

20 side. So that -- I think that does introduce a little

21 bit of an underestimate into the final result.

22   And one other point that I -- I didn't get

23 into, but let me just briefly sketch it, as to why I

24 think this is a little bit of an underestimate. I

25 haven't estimated how much. I don't think it's -- I'm

1   really speculating here about this, but it might be

2   one percent. I mean, this is the order of magnitude

3   that I'm thinking of.

4   Q   One percentage point.

5   A   One percentage point. So instead of 6.1,

6   it might be 7.1. But that's not a value that I'm

7   standing behind.

8   Here is the source of underestimation in

9   this model. You'll recall that I defined the -- the

10   threshold as the minimum for the program categories

11   for each operator -- the minima or the minimums. Now,

12   as you know, PBS is unique among program categories,

13   setting aside Canadian, in that it's the only one

14   where you have to bring in a whole signal, a whole

15   distant signal.

16   You don't find PBS distributed on

17   independent stations the way you do religious or news

18   or the other categories. So when you bring on an

19   independent station, you bring in a mixture of

20   categories but not PBS. So the operator has to bring

21   in this whole channel.

22   Well, the threshold for doing that is

23   going to be higher than the threshold that they'd have

24   for a particular program category, because they may

25   take in a channel that -- they may tolerate -- there

1 may be an area which is saturated from -- with news

2 from other -- other systems perhaps, or stations, and

3 so they get 10 percent -- they think news is worth 10

4 percent to them. But they wouldn't go out and -- and

5 buy a whole channel for news.

6 So the point is the real thresholds here

7 are for a whole channel, and they are higher than the

8 thresholds that we've been talking about. And for

9 that reason, we can still -- we can still carry

10 through this model. The way I -- the way to think

11 about it is that this model is carried through on the

12 assumption that the thresholds are the same. You're

13 just not going to make any distinction between them.

14 Q   When you say the thresholds are the same,

15 the threshold for carrying a -- the threshold value

16 that a cable operator would assign to carrying a

17 program category is the same as the threshold value of

18 bringing in a whole distant signal.

19 A   That's right.

20 Q   That's --

21 A   The assumption is that they're the same.

22 I don't mean to imply that I really assume they're the

23 same.   I only mean that as a term of art in

24 mathematics you say, "Okay. Let's assume that they're

25 the same so we can carry through the estimation." And

1   you do that and you get this answer. But then you

2   step back and you say, hey, the logic of the threshold

3   is really the same logic. But numerically, the

4   threshold is bound to be higher for bringing in a

5   whole channel, and so we've underestimated all of the

6   thresholds and --

7   Q   And if the thresholds were higher, that

8   would ultimately lead to a higher estimated value?

9   A   It would lead to a higher estimate. So --

10 now, you know, ideally -- I personally don't like to

11 leave things in so-called conservative positions.   I

12 believe in trying to get the best estimate you can and

13 not -- you know, not try to get an estimate that is

14 too low or too high.

15   But in this case, I don't know how to do

16 it well otherwise. Let me put it this way. I think

17 it's -- I believe that this is a good way to do it.

18 I think it's convincing, and I don't know how to

19 achieve that same quality if I relax that assumption,

20 because I don't know how to get at those other

21 thresholds.

22   But I don't -- as long as you're willing

23 to tolerate a small underestimate -- what, worth only

24 $5-1/2 million?

25   Q   In your judgment as an expert in

statistics, putting aside the point you've just been discussing, do you consider these adjusted shares for PBS to be reliable estimates of the average?

A Yes. Part of the by-product of this method is that you can also estimate the so-called standard errors, the measure of uncertainty, of the average share values. And those are -- that's reflected in column 5 in Table 1, which shows that the range -- the estimated range of values that are at -- at the 95 percent level of confidence possible. They're above and below 6.1.

ARBITRATOR WERTHEIM: When you first began your testimony, sir, you mentioned some uncertainty about this, because you said these data are drawn from a sample of systems. Could you explain that?

THE WITNESS: Yes. The way that -- that I've carried through this model, I haven't paid attention and I haven't, I believe, had to pay attention to the sampling background of this. That is, these -- the 173 operators were sampled from a larger number of operators in the Bortz survey.

And in the Bortz survey, they used that fact and the theory and the formulas that go with the probabilities of getting different random samples in order to estimate in usual ways what the uncertainty

1   was.   I've   approached   this   in   a   different

2   methodological   way   using   this   model   that   I've

3   discussed with you, and that model approach gives you

4   this uncertainty.

5   It -- ideally, probably the subject of a

6   Ph.D. dissertation would be to try to combine those

7   two. My judgment is that if you do that, if you try

8   to take into account simultaneously the two kinds of

9   uncertainty, it's not going to change much. You don't

10 just   add   the   other   uncertainty.   In   other   words,

11 because it's already taken into account in this model.

12 That   is,   the   way   this   model   is   construct   you   are

13 assuming you have a sample of 173 within the model.

14   You view the observations -- this is how

15 you get these estimates of uncertainty in statistics

16 is by adopting probability models, where you view each

17 observation   as   having   been   drawn   from   a   --   as   a

18 probability, from a probability distribution.   And

19 that's why you then get probabilities for ranges of

20 values,   you   can   say,   well,   if   --   if   I   had

21 gotten a slightly different drawing of 173, I'd get a

22 slightly different answer, right?

23   BY MR. HESTER:

24   Q   In other words, could you -- perhaps in

25 too simple-minded a way, is the point you're making

1   here that there are confidence intervals associated

2   with the Bortz study itself? In other words, that

3   there are confidence intervals around the Bortz

4   results.

5   A   Which are pretty similar to these.

6   Q   And the question is whether you would need

7   somehow to adjust the confidence intervals you show in

8   column 5 to take account of the other confidence

9   intervals related with the Bortz results, is that

10 the --

11   A   Yes.

12   Q   -- simple point?

13   A   Or -- or, more precisely, to counter the

14 fact that the 173 is really drawn from a finite

15 population of, what, 2,000 Form 3 operators.

16   Q   Even if one were to try to take this into

17 account, would it have any effect on the point

18 estimates you've got here? And when I say "the point

19 estimates," I mean the estimates of column 3.

20   A   No, not at all. This whole discussion is

21 independent of that. The point estimates are what

22 they are. We're just talking about fine-tuning the --

23 the intervals here.

24   Q   So when we talk about the confidence

25 intervals or how wide the confidence intervals are,

1   that is simply the width of the band around the

2   estimate you've come up with, correct?

3   A   Exactly.

4   Q   It doesn't -- no matter what you did with

5   the confidence intervals, it wouldn't change the

6   estimated average shares that you show in column 3.

7   A   No.

8   Q   Okay.

9   A   No. Because to construct the confidence

10   intervals, you -- you take the so-called point

11   estimate in column 3 and then you go up to get an

12   upper bound. For the confidence interval, you go down

13   to get a lower bound. So -- but that's a fixed point,

14   that estimate.

15   I want to call your attention to one minor

16   point. You'll notice in 1992, in column 3, the

17   estimate is 5.7. And then if you place that estimate

18   inside the confidence interval in column 5, you'll see

19   that it's -- it's between 4.7 and 7.4. You'll notice

20   that interval is not symmetric around 5.7. 5.7 is one

21   percentage point above 4.7, but 7.4 is 1.7 above 5.7.

22   That is not a mistake. That is a product of the way

23   these confidence intervals were derived.

24   There is no unique confidence interval.

25   There is no unique 95 percent confidence interval.

1   You can put down all kinds of different confidence

2   intervals that have the property that you would get

3   95 percent confidence.

4   So I could vary the method of computing

5   these confidence intervals just slightly and get a

6   completely consistent confidence interval that was

7   symmetric around 5.7, and it would -- it would be 4

8   point -- roughly, you know, 4.2 to 6 point something.

9   I mean, that -- that's what it would look like. I

10   just didn't want you to be thrown if you -- if you

11   start to look at this and say, "This isn't just 5.7

12   plus or minus the same number."

13   Q   But all of this discussion of confidence

14   intervals doesn't affect the point estimates you show

15   in column 3?

16   A   No.

17   Q   Okay. Thank you, Dr. Fairley.

18   ARBITRATOR WERTHEIM: I   have   one

19   remaining --

20   MR. HESTER: Sure.

21   ARBITRATOR WERTHEIM: -- question.

22   MR. HESTER: Sure.

23   ARBITRATOR WERTHEIM: Column 8, your

24   estimated threshold, you said is an average. Is that

25   an average that you calculated after you had put on

1   your chart all of the data entries projected by your

2   model? Or is that an estimated threshold that was

3   inherent in the geometric model you chose?

4   THE WITNESS: It's not -- it doesn't

5   really come itself from the -- it doesn't come from

6   the geometric model, so in that sense it's not

7   inherent in it.

8   ARBITRATOR WERTHEIM: But in fitting -- in

9   deciding which of several available models to use, I

10   understood you to say that you selected the geometric

11   model in .part because it was a good fit to the

12   threshold of about 10. Did I not.hear you correctly

13   on that?

14   THE WITNESS: Let's see. The.-- here are

15   the threshold values depicted down here along the X

16   axis -- 173 threshold values. The average of those

17   values is 10.8. Actually, the --

18   ARBITRATOR WERTHEIM: That's after you've

19   finished using the geometric model to put in all of

20   your dots and crosses and --

21   THE WITNESS: No, no, let me -- let me

22   clarify. These points are just the minimums -- the

23   173 rows.

24   BY MR. HESTER:

25   Q   These are the reported minima in the

1   survey results?

2   A   Yeah.   If you take the survey results --

3   ARBITRATOR WERTHEIM: In what way did the

4   geometric model fit that situation?

5   THE WITNESS: Okay.   If you -- I think

6   that's what Chart 2 illustrates.   If you plot the

7   frequencies of these thresholds in Chart 2, to my eye

8   it looks geometric.   And when I fit a geometric model

9   with a mean of 10.8, which happens to be the actual

10   mean, it -- it does fit reasonably well as I

11   discussed.

12   BY MR. HESTER:

13   Q   So   in   other   words,   the   geometric

14   distribution that you used as your model conformed

15   with what you saw in the data results?

16   A   That's right.   So it's -- it's important

17   to note, I think, that you're not just using data on

18   the 27 queried respondents.   You're using that -- you

19   have X and Y data on that, but you're also using data

20   on all 173 to get these thresholds.

21   Q   Now, one final question for you I guess,

22   Dr. Fairley.   Is your model significantly dependent on

23   the value of that estimated threshold?   In other

24   words, do the results change much based on whether the

25   threshold is 9.8 instead of 10.8?

1 A   No, it's not very sensitive to that value.

2 If you increase the threshold by one percent, you --

3   Q   One percentage point?

4   A   One percentage point -- say, 10.8 to 11.8

5 -- you would increase the estimated average share for

6 PBS of somewhat over a tenth to two-tenths.

7   Just one more footnote is that these

8 estimated thresholds, like the adjusted shares, are --

9 actually follow the royalty stratification in the

10 Bortz survey. They conform to that. So they are --

11 they are stratified estimates. It doesn't make much

12 difference. The actual -- the simple arithmetic

13 averages are -- are close.

14   Q   So you have applied the stratified

15 methodology of the Bortz survey in reporting these

16 results on --

17   A   Yes.

18   Q   -- Table 1?

19   A   The stratification, yes.

20   Q   But the results aren't particularly

21 dependent on that?

22   A   It doesn't -- in some other circumstance

23 it might be important to do that. In this case, it's

24 not.

25   Q   Okay. Thank you, Dr. Fairley.

1   CHAIRPERSON JIGANTI: Okay, Mr. Hester.

2   Who will be the first to examine

3   Dr. Fairley?

4   Mr. Stewart, you're elected.

5   ARBITRATOR WERTHEIM: Do it under --

6   MR. STEWART: I don't.   That's an

7   important observation.

8   CROSS EXAMINATION

9   BY MR. STEWART:

10   Q   Dr. Fairley, good afternoon. I'm John

11   Stewart, and I'm representing the National Association

12   of Broadcasters in this case.

13   I want just to ask you a few questions to

14   put the import of your testimony into context here and

15   to follow up on some questions that Judge Farmakides

16   asked.

17   First, are you aware that a principal

18   question before this panel is to assess the relative

19   value of the programs that were carried on distant

20   signals actually retransmitted by cable operators in

21   1990 through 1992?

22   A   I'm thinking about this because I

23   understand that, you know, the automatic zeroes were

24   -- were put in. I understand the rationale that the

25   Bortz survey has for putting in automatic zeroes. Is

1 that what you're getting at?

2   Q   I want to ask sort of a fundamental

3 question about what we're all doing here. The job of

4 this panel and all of the parties here is to come to

5 an assessment -- an evaluation -- of the relative

6 value of the programs that were carried by cable

7 operators in 1990 through 1992 on a distant signal

8 basis, right?

9   A   Yes.

10   Q   And are you aware of the fact that the

11 Bortz study surveying cable operators was designed and

12 intended to measure relative value of those programs?

13   A   Yes.

14   Q   Okay. Now, having gone through your

15 testimony, it is not your testimony, is it, that

16 because of the zero -- automatic zero problem you've

17 identified the panel should ignore or reject the Bortz

18 survey as a measure of that relative value, is it?

19   A   No.

20   Q   All right. And your testimony instead is

21 that you should make this adjustment to the final

22 results of the Bortz survey and use those adjusted

23 numbers instead of the original numbers in the Bortz

24 survey as the principal measure that the panel relies

25 on?

1   A   Yes, and then you have to make a pro rata

2 adjustment of the other shares.

3   Q   Okay. And that -- and those -- the pro

4 rata adjustment of the other shares, once you arrive

5 at a -- an estimated share for PBS that showed 6.1 for

6 1990, and other numbers for the other years, you then

7 adjust all of the shares so that the Bortz survey

8 results add to 100, right?

9   A   Yes.

10   Q   Is that what is presented in PTV

11 Exhibit 20? Do you have that exhibit?

12   A   I don't have that in front of me.

13   MS. AUSTIN: Mr. Chairman, this might not

14 be the person that -- Mr. Stewart wasn't here

15 yesterday. That -- that -- Mr. Hester is going to

16 present a revised version of Exhibit 20 with new Bortz

17 figures that were presented in the testimony.

18   MR. HESTER: That's right, Your Honor.

19 This -- I was just too tired yesterday. We will get

20 to it.

21   MR. STEWART: And I'll never miss another

22 day of the hearing, but thank you for bringing that to

23 my attention.

24   CHAIRPERSON JIGANTI: Thank you.

25 Ms. Austin.

BY MR. STEWART:

Q   And just looking at the 1990 column, and I take it those are the ones that are going to have these minor adjustments, is that correct?

A   Yes.

Q   Just looking at the 1990 columns to begin with, the left-hand column that says original is what the Bortz survey reported by itself, correct?

A   Correct.

Q   And the next column is -- shows 6.1 for the PBS share as opposed to the original 2.7, right?

A   Right.

Q   And that's the result of your having made the adjustment for the automatic zero problem that you've testified about, correct?

A   Yes.

Q   And then what you do is you adjust all of the other categories' shares downward to reflect the pro rata effect of that adjustment that you've made for PBS, correct?

A   That's right.

Q   Okay. If you'll look at this -- and let's just use sort of rounded numbers. Across the three years, the PBS -- adjusted PBS share is around six, correct, a little bit above six on the average?

1   A   Right.

2   Q   And if you look at the news/public affairs

3   category above that, the adjusted shares shown here

4   are 11-1/2, 14.3, and 12.1, do you see that?

5   A   Yes.

6   Q   That's roughly, on average, twice the PBS

7   share, is that right?

8   A   Right.

9   Q   And that's after the adjustment made by --

10   to reflect the automatic zero problem, correct?

11   A   Right.

12   Q   Okay. I have no further questions.

13   CHAIRPERSON JIGANTI: Thank you,

14   Mr. Stewart.

15   Who is next?   The Canadians have no

16   questions?

17   MR. COSENTINO: No questions.

18   CHAIRPERSON JIGANTI: The Devotionals?

19   MS. AUSTIN: No questions.

20   CHAIRPERSON JIGANTI: No questions, okay.

21   That leaves two more.

22   CROSS EXAMINATION

23   BY MR. LANE:

24   Q   Mr. Farley (sic), I'm Dennis Lane. I

25   represent the Program Suppliers in this case. Let me

1   see if I understand what you did in your charts here.

2   When you did Chart 1, were you calculating -- is that

3   where you calculated the Y and the X values at the

4   same time?

5   A   Let me turn to Chart 1. I'm not sure I

6   understand exactly what you're asking me.

7   Q   I'm asking you, is that the place where

8   you took the actual X and Y values and plotted them?

9   A   I did for the 22 non-zero PBS share of the

10 respondents.

11   Q   Did you plot X and Y shares or values for

12 the other 146 at any time?

13   A   I plotted them but only as a sort of

14 hypothetical illustration of what was going on.

15   Q   So the only time that you plotted where

16 the X matched the Y was for the 27 values, is that

17 correct?

18   A   That's right. I plotted the X values for

19 the 146 but not the -- but not Y values for them.

20   Q   Okay. So now, what did you do with the

21 zero values that were on the -- when PBS got a zero

22 value? Did you -- where did you plot that?

23   A   I didn't talk about that here. They are

24 used in -- in the model.

25   Q   Okay. And I just see, looking at

1   Exhibit 39, that there were many cases where the

2   lowest value for one of the other -- I'm sorry, it's

3   Exhibit 40. There are many other cases where the

4   lowest value that's a non-PBS value is zero, correct?

5   A   Yes.

6   Q   And where did you plot those on your

7   charts?

8   A   Well, the -- I didn't. The definition of

9   the threshold or the X value is the lowest non-zero

10   value in each row.

11   Q   So it's the non-zero value?

12   A   That's right.

13   Q   So why don't you plot zero if it's the

14   lowest value given to one of the program categories?

15   A   I don't think it gives information about

16   the threshold.

17   Q   Okay. What is the threshold?

18   A   Since they didn't carry it, to get at the

19   threshold you want to look at the -- the smallest

20   share that they actually carried.

21   Q   Well, they actually carried all of those

22   programs, didn't they, on the stations?

23   A   Oh, I'm sorry. I misspoke. It's not that

24   they didn't carry it. It's the smallest to which they

25   accorded any value. They -- except for PBS, they get

1   -- they get -- most of the time they'll get I suppose

2   all of the categories, although some of the time one

3   or more of the other categories will be absent. But

4   if they bring in an independent station, they may get

5   a category willy-nilly. They get it for free just by

6   bringing in that station, but they don't accord any

7   value to it.

8   Q   And that's not the low -- so why don't you

9   count that as the lowest value? That's what I'm

10 trying to understand, why you don't count the zeroes

11 as the lowest value.

12 A   Right. Well, as you put it, you know, the

13 zero is the lowest value. There's no question about

14 that. This -- looking at the smallest non-zero value,

15 the purpose of that is to -- it's a device to get at

16 the notion of the threshold. As I mentioned, the real

17 threshold for PBS is the threshold for bringing in a

18 whole channel.

19 You know, since PBS is the only -- one of

20 the program categories for which that is true, we get

21 a little information about that -- that real threshold

22 for PBS by looking at, for 1990, these 22 non-zero

23 values because they have to be -- the threshold has to

24 be less than each of those values. For each operator,

25 the threshold for bringing in a whole channel has to

1   be less than their observed value, by definition.

2   Q   Yeah.   But there were also -- in each of

3   the cases, there were also respondents who brought in

4   a PBS station that valued it at zero, correct?

5   A   Are you talking about the -- that's the

6   five --

7   Q   The five.

8   A   Yes.

9   Q   And the seven?

10   A   And as I mentioned, I view that as a

11   rounding -- I don't -- I don't think it's actually

12   zero. I think it's -- it's rounded to zero.

13   Q   Well, aren't the other zeroes just rounded

14   to zero?

15   A   Yes.   But I'm -- just as for PBS, I

16   haven't tried to, you know, estimate what those really

17   are. It's -- I've just taken them at face value as

18   zeroes.

19   Q   But you didn't count them as the lowest

20   value when it's clear to all of us that zero is the

21   lowest value on this table, right?

22   A   Well, I wasn't interested in the lowest

23   value. I was interested, if you like, in the next-to-

24   the-lowest value.

25   Q   Okay.   Well, in the cases where there

1   wasn't a zero, you didn't pick the next-to-the-lowest

2   value. You picked the lowest value, right?

3   A   Yes.

4   Q   So how did -- what is the basis on which

5   you decided when to pick the lowest value and when to

6   pick the next-to-the-lowest value?

7   A   I looked among the non-zero values in each

8   row. I looked just among the non-zero values, however

9   many there were, and I picked the lowest of those.

10   That's the rule.

11   Q   That's the rule.

12   A   Right.

13   Q   Okay. Now, where is that the rule? What

14   is that the rule of? I mean, where is it written that

15   that is the rule?

16   A   Okay. I mean, that's the rule I followed.

17   Your question is why?

18   Q   Okay.

19   A   Yes.

20   Q   Okay. My question is, is there some

21   statistical rule or theorem or something that tells

22   you to do that?

23   A   I think there are two answers to that.

24   One is less important but I'll give it first. If --

25   I mean, the idea here or the model or the description

of what's going on in the -- is embodied here is that there is some threshold for even a program category, in that you wouldn't take it voluntarily. I think that's the key. You may get it willy-nilly and it's a zero for you, but you wouldn't pay for it.

And if that's true, then you're trying to estimate what the -- what's the lowest value you'll go and pay for it. That's the -- that's what we're trying to get at. And this minimum or the non-zero values happens to be the maximum likelihood estimate for that threshold under that model or that description.

In other words, it's a rule that does have some theoretical basis, but I don't think that's the most important part of it. I think the most important point is that the proof of the pudding is in the eating that this works.

And why do I say it works? There are several reasons. One is it can carry through here, and it -- I feel it makes sense, and you get out sensible answers, and all of the assumptions that you make seem to be reasonably supported by the data. But there is other indirect, or other direct evidence for that matter.

For example, the primary one that I am

1   thinking of now is if you look at those thresholds for

2   the non-zero PBS operators -- that is, those operators

3   -- the 22 that gave a non-zero positive share -- those

4   X values average about seven. But if you look at the

5   thresholds for the zero PBS operators, the balance,

6   the great majority that gave -- that were given an

7   automatic zero, the average of their thresholds is

8   about 12, not quite twice.

9   So what does that say? That's some

10   evidence that for those who took it, their thresholds

11   are smaller. You would expect that the operators that

12   actually took the relatively low category of PBS

13   compared to the giants -- the movies and sports and

14   even news is double.

15   You would expect that they would be self-

16   selected to some extent, because if -- in order to

17   take a category that -- that has a specialty or a

18   niche appeal, that is not a very great appeal

19   numerically percentage-wise, relative value wise, you

20   have to get over whatever threshold there is for it.

21   And if you happen to be among those operators who have

22   low thresholds you are more likely to get over that

23   threshold.

24   So those operators that have low

25   thresholds are more likely to take -- be willing to

1   bring in channels that have a low value to them.

2   Conversely, those operators that didn't take it you

3   would expect, on average, to -- to have higher

4   thresholds.

5   Now -- and, in fact, it's quite a big

6   difference. It's almost a 50 percent difference

7   between the average threshold for the first group and

8   the average threshold for the second, so that's some

9   -- some other evidence, if you like, that's not part

10 of this model that -- that supports the reasonableness

11 of this chain of thinking. It starts from a priori.

12   It's certainly very reasonably to believe

13 in, through opportunity costs, the existence of a

14 threshold for bringing in a whole channel. And then

15 -- and then you say, "Well, gee, how can you get at

16 that?" Well, let's -- let's look at this threshold,

17 defined as I define it as the minimum and the non-zero

18 values, and this, frankly, is kind of a crude idea.

19 It's a proxy for what you're really interested in, and

20 it works. It works for the reasons that I've given.

21   So it's not something where I can answer

22 your question in a very tidy way and say, well, this

23 is this and it's -- this is the only way it can be,

24 and this is the answer, and that's what everyone does.

25 It's not quite like that.

1   Q   But we have evidence that a certain

2 number, roughly 20 percent in the first year, assigned

3 a zero value to PBS, even though they took it. They

4 are saying to us that they have no threshold, they

5 have a zero threshold, right?

6   A   Well, the five -- five out of the 27.

7   Q   Right.

8   A   In other words, you've got 20 percent of

9 those who --

10   Q   Roughly 20 percent.

11   A   -- who are responding --

12   Q   Correct.

13   A   -- that --

14   Q   Who got PBS and said it had a zero value,

15 correct, we have that evidence?

16   A   Yes.

17   Q   And we have evidence, just looking at

18 Exhibit 40, and we don't know for all of the other

19 categories, of a lot of respondents giving categories

20 zero value, correct?

21   A   I'm sorry. I didn't hear you.

22   Q   If we look at Exhibit 40, we see there are

23 a lot of other evidence that respondents gave

24 categories zero value. That is not something that we

25 never see.

1   A   Right.

2   Q   In fact, do you know how many zero values

3 there were given for all of the answers in the

4 allocation question?

5   A   For all categories?

6   Q   Yes.

7   A   No.

8   Q   You didn't look at that issue?

9   A   Well, I -- you know, I looked at the data.

10 I didn't count them up.

11   Q   You don't know whether it might be as much

12 as 50 percent?

13   ARBITRATOR WERTHEIM: Are you counting all

14 of the zeroes given to the religious and Canadian

15 programming?

16   MR. LANE: Yes, for all 173 respondents,

17 to every category.

18   MR. HESTER: You're including Canadians or

19 not?

20   BY MR. LANE:

21   Q   Well, from Exhibit 40, we can't tell

22 whether this was a zero response and there was a

23 Canadian signal taken, can we?

24   A   No. Well, it's --

25   Q   So the answer is, no, I'm not including

1   Canadian on Exhibit 40, but I might be if there was a

2   similar situation.

3   A   Well, if you take all of these numbers in

4   the first table in Exhibit 40, it's clear that on this

5   page far less than 50 are zeroes, 50 percent are

6   zeroes.

7   Q   But you don't know for the other ones how

8   many were zeroes, correct?

9   A   As I say, I haven't counted them.

10   Q   Now, do you equate the threshold with

11   being the opportunity cost?

12   A   No, I think -- I think the opportunity

13   cost is simply, as far as I've been able to determine,

14   the most important -- that seems to me to be the most

15   important cost, but there are others.

16   Q   Okay. Well, would you look on page 5 of

17   your testimony, please? And is that paragraph that is

18   on page 5, is that your effort to explain to us what

19   the threshold value would mean?

20   A   To give some idea of it, yes.

21   Q   Okay.   Well,   how   would   you   define

22   "threshold value" for us?

23   A   It's the minimum value that an operator

24   will require for the category to -- to buy it, to

25   carry it.

1   Q   And you've given two examples here,

2   correct, of threshold -- where a threshold could

3   exist, on page 5 of your testimony?

4   A   Yes.

5   Q   Now, what is the first example? I don't

6   understand. What does that tell us?

7   A   Well, if their channels that they -- that

8   they (quote) "have to bring in" to fill up their menu

9   is close to the maximum number that they can

10   technically bring in, that would be an illustration.

11   Q   What do you mean by "have to bring in"?

12   A   Well, I -- I suppose you have to carry

13   CNN, you have to carry Arts and Entertainment, or --

14   or some -- you have to carry the most popular

15   specialty channels.   And then -- then there are

16   certain regular -- regulatory mandates. You have to

17   set aside some channels for schools and the government

18   and emergencies, and so forth.

19   So you may -- an operator may pretty well

20   fill up their technical capacity for channels, and

21   have only a handful remaining to even consider for

22   distant signals.

23   Q   So when you say that you have to bring in

24   the most popular, there is no -- is there some rule

25   someplace that a cable system has to do that?

1   A   No, it really gets back to opportunity

2   cost. I mean, it would be -- in most cases, you'd be

3   a fool if you didn't.

4   Q   So that one gets back to opportunity cost.

5   Now, what does the second example mean?

6   A   That's opportunity cost.

7   Q   So both of the examples that you've given

8   of threshold relate to opportunity cost, correct?

9   A   These examples, yes.

10   Q   Are there other examples that don't relate

11   to opportunity cost?

12   A   Well, the license -- the royalty fees.

13   Q   Do you know what the royalty fee

14   calculation is for a PBS station compared to an

15   independent station?

16   A   I understand it's -- is the -- I don't

17   fully understand the ins and outs of this, but I

18   understand there's one distant signal equivalent for

19   the independents and then .25 for network affiliates

20   and PBS.

21   Q   So is it your understanding that the PBS

22   -- carrying the PBS channel as a distant signal is

23   lower or higher than an independent station?

24   A   Lower.

25   Q   Now, do you know what the 3.75 rate is for

1   royalty purposes?

2   A   Roughly. I understand that it's a rate

3   that -- that typically will begin to apply at maybe

4   the fourth or fifth distant signal that's brought in.

5   Q   And do you know whether the cost

6   generally, all other things being equal, for a PBS

7   station would be higher or lower than the 3.75 rate?

8   A   I guess a good deal lower.

9   Q   Okay. Do you know whether a PBS signal

10   can ever be carried at the 3.75 rate?

11   A   No, it cannot.

12   Q   I'm sorry? No, you don't know or --

13   A   It cannot.

14   Q   -- it --

15   A   No, I do know.

16   Q   You do know, okay. Now, so I guess to

17   come around to my question, is the threshold -- is

18   that equal to the -- the same as defined by the

19   opportunity cost, as you use it in your testimony?

20   A   No, because it could be several different

21   costs, and it's -- it's conceivable that the

22   opportunity cost would be less than the licensing

23   cost. There might be some other variant of cost. I

24   -- I can't think of one right -- right at the moment,

25   but --

1   Q   And how did you factor that into your

2 analysis?

3   A   Excuse me.

4   Q   I'm sorry.

5   A   There's an inertial cost. There's always

6 an inertial cost to change.

7   Q   Okay. How --

8   CHAIRPERSON JIGANTI: Mr. Lane, at this

9 time we need to break. We'll resume tomorrow morning.

10 Time -- we've discussed it amongst ourselves -- 9:30,

11 if it's satisfactory, or something to the contrary?

12 Dress code for Saturday, if you want to make it casual

13 tomorrow, dress down Saturday.

14   ARBITRATOR WERTHEIM: We can dress down,

15 too.

16   CHAIRPERSON JIGANTI: Oh, certainly.

17 Certainly. It's a very casual day tomorrow. 9:30.

18   MR. LANE: Here?

19   CHAIRPERSON JIGANTI: Here, yes. I do

20 have -- I'll be here earlier, because I have been

21 entrusted -- I had to sign my life away to get the key

22 to the door here, so it will be open at 9:00.

23   (Whereupon, at 5:33 p.m., the proceedings

24 in the above-entitled matter were adjourned, to

25 reconvene at 9:30 a.m., the following day.)

BEFORE THE

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DISTRIBUTION OF 1990,             ‖
                                  ‖     Docket No.
1991 AND 1992                     ‖     94-3-CARP-CD90-92
                                  ‖
CABLE ROYALTY FUNDS               ‖
                                  ‖
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Saturday, January 20, 1996

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

I N D E X

E X H I B I T S

1   P-R-O-C-E-E-D-I-N-G-S

2   (9:35 a.m.)

3   WHEREUPON,

4   DR. WILLIAM B. FAIRLEY

5   WAS CALLED AS A WITNESS BY COUNSEL FOR THE PUBLIC

6   BROADCASTING CLAIMANTS, AND HAVING BEEN PREVIOUSLY

7   SWORN, RESUMED THE WITNESS STAND, WAS EXAMINED AND

8   TESTIFIED AS FOLLOWS:

9   CHAIRPERSON JIGANTI: You may proceed, Mr.

10   Lane.

11   MR. LANE: Thank you.   Mr. Fairley,

12   yesterday we were talking about the threshold and I

13   think we got to the point where I believe that the

14   threshold was the same as opportunity cost. Is that

15   how you view it in your mind?

16   THE WITNESS: Not exactly.   I think

17   opportunity cost is the most important factor, but

18   there are other costs.

19   CROSS EXAMINATION

20   BY MR. LANE:

21   Q   What would those other costs be?

22   A   I mentioned the licensing fees and costs

23   of inertia, the various costs associated with making

24   a change.

25   Q   Now are the threshold costs or the

1   threshold -- is the threshold value the same for each

2   station?

3   A   No.

4   Q   Is it the same for each cable system?

5   A   Oh, excuse me.   When I answered the

6   question earlier, I was thinking of cable systems

7   because that's what this applies to, thresholds to

8   cable systems.

9   Q   It also applies to stations, doesn't it?

10   A   In what way?

11   Q   Isn't that's what is being valued for

12   public television?

13   A   Well, I'm not dealing with thresholds for

14   stations.

15   Q   You're not?

16   A   No.

17   Q   Okay. What are -- what are the thresholds

18   with which you're dealing with?

19   A   Thresholds for cable operators for

20   bringing in distant signal channels. Is that what you

21   mean, threshold for bringing in a station?

22   Q   Is that -- do you know what a distant

23   signal is?

24   A   Yes.

25   Q   What is it?

1   A   Roughly a signal that comes in from

2   outside of 30 -- about 35 miles around a market area.

3   Q   Okay. And is the signal related to a

4   television station?

5   A   Yes, it comes from a station I think.

6   Q   So aren't you measuring the threshold of

7   stations when you -- of the carriage of public

8   television stations?

9   A   I don't -- I don't think about it that

10 way. Maybe you have something in mind that I don't.

11 I'm attaching a threshold to each operator, but it's

12 attached to the operator.

13   Q   Okay. Is the threshold the same for all

14 operators?

15   A   No.

16   Q   Is it the same when an operator considers

17 different distant signals? Is it the same for all

18 distant signals?

19   A   No, it wouldn't necessarily be the same.

20   Q   What factors would have to be considered

21 in determining what the value was for individual cable

22 operators?

23   A   The -- their relative value.

24   Q   What -- what would be factors that you

25 would consider that a cable operator would have to

1 take into account in arriving at his or her threshold?

2   A   Well, I'm certainly not a cable expert,

3 but I understand that attracting or retaining

4 subscribers is the paramount concern of cable

5 operators and to a much less important degree,

6 consideration of advertising revenue that they may be

7 able to insert in some signals -- distant signals.

8   Q   And what factors do you think go into

9 attracting and retaining subscribers?

10   A   The factors that I've seen mentioned as

11 important are the types of programming, having those

12 types that are most important to people, the -- a

13 variety of programming so that you -- you're not just

14 attracting one part of the market, but you're able to

15 hit all the interests, niches in the market.

16   Q   Okay.   In looking at the individual

17 responses, did you consider those factors?

18   A   Only in a very general way. The approach

19 here does not rely on any particular expertise or deep

20 view of the cable market.

21   It's based on a common sense or sensible

22 idea of the existence of a threshold and the data

23 support that for PBS. The Tribunal itself, page six -

24 - excuse me, page five in my testimony, footnote five:

25 in their 1983 decision, it talked explicitly about the

1 value, without using the word -- about the threshold,

2 the bottom of the page there, supposing --

3   Q   Is that in footnote five on page five --

4   A   Yes, page five.

5   Q   -- of your testimony?

6   A   Yes.

7   Q   Does the word "threshold" appear anywhere

8 in the quotation that you have from the Tribunal?

9   A   No. No, as I just said, it doesn't appear

10 explicitly, but it --

11   Q   What part --

12   A   -- it's exactly --

13   Q   I'm sorry.

14   A   Threshold is being discussed here.

15   Q   Do you think -- do you see that they use

16 the word "attitudes" in there?

17   A   Yes.

18   Q   Is that what you're equating with

19 thresholds?

20   A   Roughly, yes.

21   Q   Now, is that your understanding of what

22 the Bortz Survey measured, attitudes?

23   A   No. The Bortz Survey is not a measure of

24 -- well, that's why I say very roughly. I don't think

25 attitudes is -- they have it in quotes here, and I

1   think for a reason, that it's not, I think, exactly

2   the right word.

3   And when you talk about a business

4   judgement, a business view of value, you know, you

5   could call that an attitude. But it's rooted in some

6   objective market, financial -- it's rooted in, let's

7   say, in some market and financial realities.

8   These realities may not or are certainly

9   not always easy to quantify or make explicit or make -

10   - or analyze. But business judgement is important.

11   Business judgement will include gut feeling,

12   intuitions about value and -- you know, if you want to

13   call a -- the gut feeling that a business person uses

14   to make a business decision an "attitude," I suppose

15   that's possible.

16   But the -- there is an important

17   distinction in the survey research between so-called

18   attitude research, which is the nature of -- do you --

19   overall, do you have a favorable opinion of Bill

20   Clinton as our President? I mean, that's -- that's an

21   attitude. That's a classic attitude.

22   Or do you feel wonderful when you use

23   Revlon? You know, these are attitudes. And a lot of

24   market survey research has to do with exploring these

25   attitudes. And in particular, when they tip over --

1 in fact, this is a classic threshold phenomenon in

2 market research, the so-called choice models which are

3 used by every research organization.

4 When your attitude so-called "tips over"

5 to a buying decision, that's -- that's what the seller

6 is interested in.

7 And so these marketing models are directed

8 at estimating, in fact, those -- those kinds of

9 tipping points and related phenomenon.

10 ARBITRATOR WERTHEIM: Mr. Fairley, I

11 wonder if you could take a closer look at that

12 sentence, that footnote on page five, the last

13 sentence quoting from the Tribunal, and ask you to

14 consider again whether the word "attitudes" is being

15 used as the equivalent of threshold or whether, in

16 fact, it might not be a reference to market value

17 placed upon a distant signals by the cable operator?

18 THE WITNESS: Yes. I think that's right.

19 I don't think the word "attitude" itself is referring

20 to the threshold. What --

21 ARBITRATOR WERTHEIM: Would the phrase

22 "actual behavior" be a vague way of referring to the

23 threshold that would trigger actual behavior?

24 THE WITNESS: Yes, I think that the phrase

25 "short of actual behavior" embodies the notion of the

1 threshold.

2   BY MR. LANE:

3   Q   So a threshold is short of actual

4 behavior?

5   A   Well, the behavior is short of the

6 threshold.

7   ARBITRATOR FARMAKIDES: Well, wait a

8 minute. I have a problem. We're talking about a

9 range. We're talking -- the range is zero on the one

10 hand and actual behavior on the other hand, and

11 attitude was someplace in the middle according to this

12 footnote as I understand it.

13   THE WITNESS: Yes.

14   ARBITRATOR FARMAKIDES: The attitude is

15 greater than zero, but short of it. So we're talking

16 about a range there. Now, where would threshold fit?

17 Did you ask that question, Mr. Lane?

18   MR. LANE: I was trying to, but you did it

19 much better.

20   ARBITRATOR FARMAKIDES: No, I just wanted

21 to be sure that I understand.

22   MR. LANE: Yes.

23   ARBITRATOR WERTHEIM: Could the word

24 "attitudes" here in quote be simply a reference to the

25 general description of the Bortz Survey as an attitude

1   survey?

2   THE WITNESS: I don't know from the entire

3   context whether that was true. I wouldn't have read

4   it that way just reading this paragraph. And my

5   initial comment --

6   ARBITRATOR WERTHEIM: Do you want to take

7   the preceding sentence, which also uses the word

8   "attitudes." Would that help you at all to understand

9   what they're referring to here?

10   THE WITNESS: "Therefore, we" --

11   "Supposing a cable operator?" "If his attitude were

12   only of the measure" -- well that I think, Judge

13   Farmakides -- I believe that's correct, that the --

14   there are three things here.

15   There is zero, and then they talk about

16   attitudes. And the sentence you just mentioned, Judge

17   Wertheim, is that the attitude was only the measure of

18   five percent. And that is below -- must be below a

19   tipping point.

20   And "actual behavior" is referring to

21   those occasions when operators actual buy PBS. So

22   somewhere between -- in this -- in this example, the

23   threshold would lie somewhere between five percent and

24   -- well, it's -- it's the point hypothesized -- it's

25   the tipping point.

1   Somewhere above five percent, they're

2   going to say, "Okay, we're going to buy that."

3   BY MR. LANE:

4   Q   Let me ask you this. Let's assume this is

5   a continuum. We have zero on one side. We have

6   actual behavior on the other side, okay?

7   A   Okay.

8   Q   Somewhere in there, I think, are attitudes

9   and thresholds. Tell us where they lie in that

10   continuum.

11   A   Well, I think -- I believe the word

12   "attitude" here is being used to -- as a synonym for

13   a business judgement about value. So that, depending

14   on the operator, that -- the business judgement will

15   be somewhere between zero and actual behavior.

16   Q   All right. Okay, I think all of us

17   understand that. Where would threshold be, as you use

18   the term "threshold?"

19   A   Well, it's somewhere -- it's the value

20   there. It's hypothesized. It's nothing that's

21   written down in --

22   Q   Is it higher than attitude, but below --

23   MR. HESTER: Let's let the witness finish

24   his answer.

25   MR. LANE: Okay.

THE WITNESS: It's nothing that the cable operator can write down in a submission to a regulator. It's -- you know, it's not -- it's not a measured quantity, but it is a conceptual quantity that is widely used and understood in business, and for that matter in every day life or public affairs.

You know, it's a very general common notion.

BY MR. LANE:

Q. When you say it's not measured, that's precisely what you did on Table 1, Column 8 of your testimony, isn't it?

A Well, it's certainly not conventionally measured. Yes, I have a -- I have a measure of a threshold concept. I've distinguished it as being less than the -- the real concept of interest here.

But making the definition that I've done as the minimum observed value for each operator, that provides -- that enables us to have a framework within which we can carry out a definite procedure and understand it.

And then we can go back and say okay, now let's think about any -- what's wrong with it? And what's wrong with the threshold is we know it's too low.

1   And we can ask well, what effect does that

2   fact have on the estimates made from the -- this --

3   the basic framework?

4   Q   Okay, you said the threshold is not the

5   real concept of interest here.   What is the real

6   concept of interest here?

7   A   I'm not sure I recall exactly what -- why

8   I said that.   I mean, the primary concept of interest

9   or the objective here is defined as the average share

10   or the relative share.   That's the -- that's the

11   primary concept.

12   Q   Now, I'd like to just stay with page five

13   if you have it open.   Do you see you -- at the bottom

14   of that page, the last sentence that begins "For

15   example," and you say "A threshold could exist if a

16   cable operator had some maximum numbers of distant

17   signals that it could profitably carry," correct?

18   A   Yes.

19   Q   Now if I go down to footnote five, the

20   first sentence that you've quoted from the 1983

21   decision says, "Supposing a cable operator faces the

22   reality of being able to import only four distant

23   signals."   Do you see that?

24   A   Yes.

25   Q   Now, is that the same thing as what you've

1   stated up in the text as a cable operator having some

2   maximum number of distant signals that it could

3   profitably carry?

4   I mean, are those two ways of saying the

5   same thing?

6   A   I think they're very close. I think --

7   I'm sure it would be possible to develop, you know,

8   some various distinctions. But I think roughly

9   speaking, they're close.

10   Q   Okay. Now you say that a threshold could

11   exist in that situation, correct?

12   A   Yes.

13   Q   And are you equating that threshold with

14   what the Tribunal calls an "attitude" in the language

15   that you've quoted from the decision?

16   A   No. The attitude here is -- well, I don't

17   know whether they might call the threshold itself an

18   attitude. The attitude, it seems to me, is referring

19   to any value from zero up to, and probably including,

20   the threshold.

21   ARBITRATOR WERTHEIM: I don't understand

22   that. That's a very general term. But as they're

23   using it here, isn't it a reference to the five

24   percent valuation that the cable operator puts on PBS,

25   which is greater than zero but less than whatever

1   level would trigger its actual behavior.

2   THE WITNESS: So if I understand you,

3   you're saying that the five percent is one thing, and

4   then the attitude is their view of it?

5   BY MR. LANE:

6   Q   No, what he's saying is the attitude is

7   approximately five percent, but that appears to be

8   short of actual behavior.

9   A   Yes. I thought what I said was consistent

10 with that.

11 Q   Why do you think it was consistent with

12 that?

13 A   Well, I'm not -- let's see, look at the

14 chart here. It might be helpful.

15 Q   Okay.

16 A   Let's see, here's zero and here are the

17 possible share values. Here is the -- here is the

18 threshold. Here is five percent. What's observed is

19 something out here.

20 ARBITRATOR FARMAKIDES: Dr. Fairley, could

21 you -- you'd better label what you're saying because

22 we'll never be able to figure it out later.

23 THE WITNESS: Okay. I have a horizontal

24 line here corresponding to a measurement on share

25 value. It starts at zero; it goes up to five and it

1   goes up to some threshold value.

2   ARBITRATOR FARMAKIDES: Maybe you could

3   just put an "A" there.

4   THE WITNESS: "A?"

5   ARBITRATOR FARMAKIDES: Or "T."

6   THE WITNESS: "A" for threshold? "T" for

7   threshold, okay. And then I put an "X" beyond the

8   threshold to indicate this would be the actual

9   behavior observed.

10   And always -- you know, strictly speaking,

11   is that the actual behavior is at or above the

12   threshold. You don't know -- when talking about this,

13   you don't care where the threshold is except that it

14   has to be below the actual behavior.

15   And in the paragraph from the decision,

16   five percent must be below that threshold.

17   BY MR. LANE:

18   Q.   Is -- I'm sorry.

19   A   I'm finished.

20   Q   So we know that the attitude must always

21   be below the threshold?

22   A   Well at this point, I'm a little --

23   MR. HESTER: Are you asking him about --

24   THE WITNESS: -- unsure about what

25   different people are meaning by "attitude."

1   BY MR. LANE:

2   Q   Well, you used this quotation as

3   supporting your discussion of threshold. I mean, we

4   didn't make this up. This is from your testimony, and

5   I'd like you to explain how this supports your

6   testimony. That's what we're trying to find out here.

7   A   Okay. Well, I think this paragraph -- I

8   believe this paragraph is clearly talking about

9   exactly the situation that I'm describing. I think I

10   had put up here the essence of that in paragraph -- in

11   casting -- in the framework that I've used.

12   And I think -- I think -- I'm getting to

13   the point of splitting hairs here to talk about

14   whether the attitude -- well, it seems me at the

15   moment that the attitude is not exactly the measure.

16   It's the view about the measure in the second

17   sentence: "If his attitude were only on the measure

18   of approximately five percent towards PBS, he or she

19   would not carry a PBS signal."

20   Now, I can read that either as -- I think

21   it's possible to read that sentence as saying attitude

22   is referring either to the five percent itself, that's

23   an attitude, or I personally think preferably that the

24   word "attitude" there is referring to the business

25   judgement of that business -- about five percent being

1   what the value is.

2   Q   Okay.   But that five percent and the

3   threshold is something different from the value?

4   A   I didn't follow that.

5   Q   Well, you said that the five percent was

6   the value, correct?

7   A   It's the value that's referred to in this

8   paragraph.

9   Q   Oh, you just mean it's a numerical value?

10   Do you mean --

11   A   Yes.

12   Q   -- it's value by the cable operator or

13   it's just a numerical?   They happened to pick five

14   percent.   They could have picked any other number.

15   A   No, that's their -- their value.

16   Q   Okay, I'm still confused.   What do you

17   mean by "value?"   Do you mean just a numerical value?

18   Do you mean the value of the cable operator?

19   A   The cable operator's economic value.1

20   Q   So the threshold is different from the

21   cable operator's economic value?

22   A   In general, yes.

23   Q   Okay.   So where -- how do we define the

24   threshold then, as something less than actual behavior

25   but more than the economic value?

1   A   No, the actual --

2   ARBITRATOR WERTHEIM: Excuse me, Mr.

3   Fairley. Are you assuming a situation in which a zero

4   value hasn't been assigned by the Bortz Survey because

5   the operator did not actually buy a PBS distant

6   signal?

7   THE WITNESS: Yes.

8   ARBITRATOR WERTHEIM: Just so that's

9   clear. You're not talking about all cases, just that

10   category.

11   THE WITNESS: Right. That's, I think, the

12   only category we can talk about.

13   MR. HESTER: But, if I can just interject

14   for a minute, I think that may help clarify the

15   discussion. If you make it clear you're talking about

16   a cable operator that didn't carry a distant signal,

17   I think that may help.

18   THE WITNESS: Yes, I certainly wasn't

19   aware of that assumption.

20   MR. LANE: Okay.

21   THE WITNESS: So let's see, we're in the

22   case where they have responded to the interviewer and

23   they have said --

24   BY MR. LANE:

25   Q   They haven't responded -- yes, that's

1   right. They didn't take a PBS station.

2   A   Oh, they didn't take a PBS --

3   Q   No.

4   A   So it's an automatic zero.

5   Q   That's what I think this is talking about,

6   isn't it? That's what this whole discussion was

7   talking about. That's what you say in --

8   A   Yes, that's what I thought before.

9   Q   -- footnote five, right?

10   A   Then I thought we were now talking about

11   this other case.

12   Q   I'm not talking about --

13   A   Okay, we're talking about an automatic

14   zero case.

15   Q   Right.

16   A   This is an operator --

17   Q   That's what you say in the footnote number

18   five, right?

19   A   Right, yes.

20   Q   That's what I'm trying to figure out what

21   you mean by what you've said in that footnote and

22   compared to your text, and how that relates to

23   threshold.

24   A   Okay.

25   Q   Okay?

1   A   I'm not -- I'm sorry, I'm not hearing

2 exactly what your difficulty is with what I've said.

3   Q   Okay. What I would like to know is

4 threshold different in that situation? It's lower

5 than the decision to purchase, correct?

6   A   Yes. Now, the decision to purchase -- the

7 actual behavior corresponds to an economic value,

8 which is just analogous to the economic value of five

9 here.

10   But this one is above the threshold value.

11   Q   Okay. But the decision to purchase is

12 higher than the threshold value. Is that correct, in

13 all cases?

14   A   Yes.

15   ARBITRATOR WERTHEIM: I thought you said

16 earlier that it was equal to --

17   THE WITNESS: It doesn't matter because

18 we're talking about a continuum here. So if it's --

19 I mean, you can define it either way. In the

20 framework that I've used, it makes no difference.

21   Yes, I did use that phrase: "equal to or

22 greater than." So that's the way I've generally

23 thought of it. If you reach the threshold, then

24 you'll buy.

25   But you could define it the other way, and

1   it's the same concept. And --

2   ARBITRATOR WERTHEIM: So would it be fair,

3   as used in the context of this paragraph, to say that

4   threshold is whatever the economic value would trigger

5   actual behavior?

6   THE WITNESS: Yes. Yes, I would accept

7   that.

8   ARBITRATOR FARMAKIDES: Now you would

9   accept that, sir, within the meaning of Mr. Lane's

10   question, which is Mr. Lane is asking you to explain

11   what you mean here by your testimony.

12   So what you've just said applies to Mr.

13   Lane's question? That's the way you define it?

14   THE WITNESS: I don't -- I would define it

15   in response to any question, I believe. I don't see

16   the difference. I don't --

17   ARBITRATOR FARMAKIDES: Well -- well --

18   THE WITNESS: -- see now a difference.

19   ARBITRATOR FARMAKIDES: I guess I'm

20   confused. When you define "threshold" as being equal

21   to an actual value -- no, perhaps any point up to and

22   including actual value --

23   THE WITNESS: Yes.

24   ARBITRATOR FARMAKIDES: -- it's an

25   economic value up to and including actual value?

1   THE WITNESS: Well, I would say --

2   ARBITRATOR FARMAKIDES: How -- how would

3   you --

4   THE WITNESS: It's one value.

5   ARBITRATOR FARMAKIDES: But that one value

6   can approach or equal the actual value --

7   THE WITNESS: Yes.

8   ARBITRATOR FARMAKIDES: -- at any point

9   along that continuum?

10   THE WITNESS: The actual value could be

11   anywhere up here including --

12   ARBITRATOR FARMAKIDES: Yes, but the

13   actual value that you have on Chart 4 is a specific

14   point on that line.

15   THE WITNESS: Yes.

16   ARBITRATOR FARMAKIDES: Your threshold can

17   approach or equal actual value, but cannot pass actual

18   value.

19   THE WITNESS: I see what you mean, yes.

20   ARBITRATOR WERTHEIM: Are you using the

21   actual value, Judge, to refer to the "X" on the chart?

22   ARBITRATOR FARMAKIDES: Yes, that's the

23   actual value --

24   ARBITRATOR WERTHEIM: Okay.

25   ARBITRATOR FARMAKIDES: -- insofar --

1   insofar as I understood you to characterize that "X."

2   THE WITNESS: Yes.

3   ARBITRATOR FARMAKIDES: So going back then

4   to Judge Wertheim's question, which is -- which is my

5   -- I'm also confused by the same thing.

6   You're saying that any point up to that

7   actual value could be a threshold value?

8   THE WITNESS: It could be, although the

9   notion is that it's a fixed value. You don't know

10   what it is exactly --

11   ARBITRATOR FARMAKIDES: Yes.

12   THE WITNESS: -- but it could logically be

13   any value up to and including the "X."

14   ARBITRATOR WERTHEIM: But in this example,

15   we know it's greater than five?

16   THE WITNESS: We know it's greater than

17   five.

18   ARBITRATOR WERTHEIM: Because that's

19   postulated in the paragraph?

20   THE WITNESS: Right.

21   MR. HESTER: Judge -- Judge Farmakides, in

22   your questioning, are you -- you're assuming a cable

23   operator that actually decided to carry a public

24   television signal? Is that the case, Your Honor?

25   ARBITRATOR FARMAKIDES: Actually, I'm

1   going to Mr. Lane's question.

2   MR. HESTER: Okay.

3   ARBITRATOR FARMAKIDES: And Mr. Lane's

4   question is, from my point of view, an important

5   question. He's asking as between zero and actual

6   behavior where does the threshold value lie and where

7   does that threshold value lie in view of the attitude,

8   the term "attitude", used in that same paragraph that

9   Dr. Fairley has cited?

10   MR. HESTER: I don't want to interfere

11   with Mr. Lane's cross. I would just suggest that

12   there are two different cases. And the confusion

13   arises because there is one case where the cable

14   operator carried a distant signal and the other -- a

15   PBS distant signal and the other case where it did

16   not.

17   And I think the confusion is arising

18   because if you're asking Dr. Fairley about this "X" on

19   Chart 4, that's meant to represent a cable operator

20   that carried a distant signal.

21   The footnote in the discussion that Mr.

22   Lane was asking about was in relation to an operator

23   that didn't.

24   And I'm just trying to help with the

25   exposition here. I think there are really two

1   separate cases that may -- that helpfully --

2   MR. LANE: And I happen to disagree with

3   that.

4   ARBITRATOR FARMAKIDES: I agree.

5   MR. HESTER: Okay.

6   ARBITRATOR FARMAKIDES: I think I

7   understand Mr. Lane, and I'm very sorry to have gotten

8   involved. I -- Dr. Fairley, I too am confused. And

9   frankly, I thought we were talking about your

10   testimony on page five and your footnote five and that

11   you were explaining your footnote five as it relates

12   to your testimony.

13   THE WITNESS: My problem is I don't fully

14   understand Mr. Lane's problem. And it's --

15   BY MR. LANE:

16   Q   Okay, let me try to -- let me try to

17   explain it.   The Tribunal says there's something

18   called "zero," okay?

19   And there is something called "actual

20   behavior." Now I thought in Chart 4, Case A, which is

21   the continuum between zero and "X," I thought the "X"

22   stood for actual behavior, regardless of whether the

23   cable system took that actual behavior and carried a

24   distant PBS signal or not.

25   That wasn't part of the Tribunal's

1   decision. They just said there's something called

2   "actual behavior," right?

3   A   Yes.

4   Q   All right. So in my mind, the "X"

5   represents actual behavior, regardless of whether they

6   took a station or not. But if that makes a

7   difference, please go ahead and explain it.

8   I thought you were explaining where they

9   didn't take a station --

10   A   I'm using "X" as actual behavior in any

11   case.

12   Q   In any case, okay. Now let's get that.

13   Is the "T" -- is the threshold equal to actual

14   behavior? Is that the point where you tip over to

15   actual behavior, to use your phrase?

16   A   "T" is the point where you tip over to

17   actual behavior.

18   Q   So does "T" have to equal "X" on that

19   continuum or lie right at "X" on that continuum?

20   A   I don't read the last sentence in footnote

21   five --

22   Q   I don't care about the last sentence. For

23   your purposes, does --

24   A   For my purposes.

25   Q   -- the "T" equal "X."

1   A   No.

2   Q   Okay.

3   A   The "T" is equal to or below "X."

4   Q   And where does attitude fit into that

5 situation? Is attitude equal to "T" or threshold or

6 is it somewhere else?

7   ARBITRATOR WERTHEIM: You're referring to

8 "attitude" as used by the Tribunal in this --

9   MR. LANE: Correct.

10   ARBITRATOR WERTHEIM: -- in these few

11 sentences?

12   MR. LANE: Correct, without limiting to

13 the five percent number because that, it seems to me,

14 to be what the confusion is.

15   I don't want to tie the attitude to --

16   ARBITRATOR WERTHEIM: I thought we --

17   MR. LANE: I don't want to tie the

18 attitude to five percent. I don't care about that.

19   THE WITNESS: Okay. And I don't think in

20 the last sentence, the Tribunal was tying it to five

21 percent either.

22   BY MR. LANE:

23   Q   Right. What I would like to know is does

24 attitude equal threshold in the way that you use

25 threshold?

1   A   Okay, but just to be clear, we're now back

2 -- you're now back to asking me what I understand

3 about this sentence.

4   Q   And how it relates to your testimony.

5   A   Okay. Well, the way I read this sentence

6 is that attitude applies to an operator's view of this

7 whole situation. They have, if you like, an attitude

8 about threshold. They have an attitude about values

9 that are below the threshold. And they have an

10 attitude about values above which will lead to their

11 actual behavior to buy.

12   Q   So the attitude doesn't have to equal the

13 threshold. It can be either higher or lower. It can

14 be anywhere.

15   A   I think so.

16   ARBITRATOR WERTHEIM: I find this whole

17 explanation rather confusing and unnecessary. Because

18 if you look at the history of the evidence before the

19 Tribunal, although we're not doing it much this year,

20 in prior years, the Bortz Survey was always

21 characterized as an attitude survey because it asks

22 the cable operators what would you do in a

23 hypothetical situation, not what did you actually do

24 last year.

25   So it measures their attitudes in the

1 sense of asking them what value would you assign? And

2 in that context, the attitude decides the value of

3 five percent in the hypothetical in this footnote.

4 And I don't understand any other way to read it.

5   MR. LANE: I hope that I will show you --

6   ARBITRATOR WERTHEIM: And I want to make

7 sure that the witness is sufficiently familiar with

8 the prior decisions and documents used in the term

9 "attitude" or "attitude survey" in this context.

10   It's not a generic term here. It's a term

11 of art.

12   THE WITNESS: If I could respond to that?

13 I was drawing a distinction between the word

14 "attitude," as used in market research and survey

15 research generally where it does apply to questions of

16 highly subjective and taste and preference and

17 emotion; such as your feeling about Clinton or your

18 feelings about Revlon and so forth.

19   Now I think there is an important

20 distinction between that kind of attitude research,

21 those kinds of attitude questions, and the use of the

22 word "attitude" in previous discussions here, which

23 I'm very familiar with.

24   I understand that the Bortz Survey here

25 has been characterized, at least by a number of

1 people, as an attitude survey for the reason that you

2 stated, that it's asking people about an opinion about

3 what they would do.

4   And in that sense, it's asking for an

5 opinion, or I would say characterize that opinion as

6 some business judgement.

7   And I understand how you can call that an

8 attitude also, but I think that's very different from

9 the usage in this other area. I think there's an

10 important distinction there.

11   And in principal -- I mean, I think one of

12 the distinctions is that there is far more of a -- it

13 makes far more sense to think of a concept of a true

14 value that that person is responding to.

15   In other words, it's - you could -- you

16 could -- Bortz could carry out a survey of cable

17 operators and ask their financial officer what they

18 think their book net worth was at the end of last

19 year.

20   Obviously, that's a figure that is known.

21 It's in the financial statement.

22   And that person may or may not remember

23 it, or maybe ask them something else that you wouldn't

24 expect the Chief Financial Officer to really know like

25 the exact value of your receivables from some segment

1   of the market.

2   That's an objective number and the survey

3   can be conducted and say what is your opinion about

4   that number?

5   And they would give their opinion. And

6   that -- that you could characterize as an attitude,

7   but that, at the same time, there's an objective

8   number. You can go back and see what the real number

9   is and compare it to their opinion.

10   And I think here we're closer to that

11   situation than we are to the Revlon situation, because

12   I think there's -- there certainly isn't great clarity

13   about the concept of the value that's being discussed

14   here.

15   But I think there's enough that what

16   they're being asked is closer to asking them about

17   some objective reality.

18   BY MR. LANE:

19   Q   And the objective reality for the 146

20   systems was that they didn't carry a public television

21   station as a distant signal, correct?

22   A   That's part of it, yes.

23   Q   But that -- for purposes of this

24   proceeding, that's precisely what the objective

25   reality is, isn't it?

1   A   I wouldn't say "precisely." I mean, there

2 are lots of aspects of the objective reality,

3 including the fact that those operators will -- just

4 because they didn't carry it, doesn't mean they assign

5 economic value to it.

6   Q   Did the cable operators get a benefit from

7 a distant public television station in any of those

8 situations?

9   A   Well, they certainly have a benefit of

10 participating in a market where they have all these

11 options. And as circumstances change, as they keep

12 track of the value that they attach to public

13 television, that value may reach above the threshold

14 at any time.

15   Q   And that year, maybe they'll get some

16 royalties for it, right? But in the years in

17 question, they didn't carry a public television

18 station, did they?

19   A   The 146 --

20   Q   The 146.

21   A   -- in 1990?

22   Q   Right.

23   A   They didn't carry it.

24   Q   And the cable operators received no

25 benefit, did they, from carriage of a distant public

1   television station because they didn't carry one.

2   A   Well in that sense, I'm really relying on

3   a somewhat different notion of value which I

4   understood the Tribunal to have adopted.

5   Q   Did the cable subscribers on those 146

6   systems get any benefit from the distant carriage of

7   public television stations that weren't on those

8   systems?

9   A   Well, not a direct benefit. If it wasn't

10   carried, as I mentioned, there's the notion of the

11   market. And that's an important -- the participation

12   of public television in that market, I think, is a

13   non-trivial benefit to all the participants.

14   Q   But none of these people actually received

15   a distant public television station, correct, none of

16   these subscribers?

17   A   Right.

18   Q   And have you heard any of the testimony

19   about public television's alleged harm from distant

20   carriage of public television stations?

21   A   Some of that, yes.

22   Q   And whatever that testimony said, it

23   doesn't apply to situations where no public television

24   station was carried as a distant signal, does it?

25   A   Right, I think so.

1   Q   So your threshold value is measuring

2   something other than what actually happened, right?

3   A   Well you know, in the sense of what you've

4   been talking about, yes.

5   Q   Now would a threshold value apply equally

6   in the situation of the other program types where a

7   zero value was assigned, just conceptually?

8   A   When you say "when a zero value was

9   assigned" --

10   Q   Yes.

11   A   -- do you mean Canadian?

12   Q   No.

13   A   Do you mean --

14   Q   I'll exclude Canadian. I assume Canadian,

15   you would agree, is in the same situation as public

16   television.

17   A   Yes.

18   Q   Okay. Put those two aside. Is there a

19   threshold value that applies in other zero value

20   situations within the Bortz Survey?

21   A   What are -- these other zero value

22   situations are where the interviewer has asked and the

23   respondent says zero value for that category?

24   Q   Correct, correct.

25   A   I'm not sure particularly what you're

1 getting at, but the threshold concept applies

2 throughout here.

3   Q And so that would apply in that situation?

4   A Yes.

5   Q Okay. Now did you analyze the threshold

6 value for all the other zero situations in the Bortz

7 studies for the three years?

8   A Not specifically, no.

9   Q So in other words, you took this value for

10 one of the categories at issue, and you -- and you

11 made those, your judgements, based upon those

12 valuations. And then you applied it as if no other

13 category was affected by the same thing. Is that

14 correct?

15   A I'm not -- I'm not really following you.

16   Q Okay, you applied the threshold to public

17 television zero values, correct?

18   A Well, where did I do that? I mean, what

19 exactly are you talking about?

20   Q I'm talking about Table 1 of your

21 testimony, page nine.

22   A Okay.

23   Q Okay. Am I correct -- maybe I don't

24 understand Table 1, which is highly likely I can

25 assure you. Table 8 -- I'm sorry, column 8,

1   "Estimated Threshold," was a key factor in putting

2   together this table, correct?

3   A   Right.

4   Q   Okay. And the threshold, the numbers that

5   we see there, are applicable to public television

6   only, correct?

7   A   Yes.

8   Q   I mean, you didn't figure out the

9   threshold values for the other zero value situations

10   in --

11   A   You keep saying "zero value situations,"

12   but this applies -- those are very exceptional. This

13   whole -- this work applies to all of the shares, not

14   just to that -- exceptional situations.

15   I'm having trouble at getting at what

16   you're --

17   Q   Okay, so maybe then I don't understand.

18   A   Yes.

19   Q   The estimated threshold would apply to any

20   zero in the Bortz Surveys for those years?

21   A   Let's see, you have a threshold of 10.8

22   for 1990 --

23   Q   Right.

24   ARBITRATOR WERTHEIM: Are you including

25   the zeros that are reported as well as those that were

1 assigned?

2   MR. LANE: Yes, absolutely. Do you

3 understand what I'm trying to do?

4   THE WITNESS: Oh okay, you're -- I see.

5 I thought you were just referring to the -- because I

6 thought I asked you -- I thought you said you were

7 just referring to those to which a respondent said

8 zero, so they were asked.

9   BY MR. LANE:

10   Q   Yes, I --

11   A   But you're also talking about the

12 automatic zeros?

13   Q   I'm talking about -- I thought -- I

14 thought column 8 only applied to the automatic zeros

15 for public television stations. And I am -- but you

16 disabused me of that notion.

17   Now I'm asking you if it applies to all

18 zeros, whether someone answered zero or it was an

19 automatic zero.

20   A   Well, this whole approach was developed to

21 get reasonable estimates of the share of values that -

22 - the average share of value that operators who were

23 not asked would have given.

24   Q   I understand that. I just want to deal

25 with one part of that approach, and that's the part

1   that's shown in column 8 of Table 1 of your testimony.

2   And that refers to the threshold value,

3   correct?

4   A   Right.

5   Q   And that is the number that we've been

6   discussing all morning up to now pretty much, right?

7   A   10.8 is the number?

8   Q   Yes, for 1990.

9   A   Right.

10   Q   Now does that number apply -- if I wanted

11   to, for whatever reason -- if I went back to exhibit -

12   - to your Exhibit 40, which is the chart of the

13   responses for the one -- the 22, right?

14   A   Correct.

15   Q   Okay, if I wanted to go, for example, in

16   the number three respondent gave a zero to religious.

17   Do you see that?

18   A   Yes.

19   Q   Okay. If I wanted to somehow determine a

20   threshold value for that religious answer for that

21   respondent, could I start with the 10.8 or could I use

22   it or however you used it in your testimony, could I

23   use it to make an adjustment or the same calculation

24   for that religious?

25   A   I'm thinking about this because I

1   developed this for the PBS automatic zero shares. And

2   I haven't applied it to all of the categories.

3   The minimums, or the non-zero values, for

4   the different operators, that's the same number, no

5   matter who you're -- you're -- no matter how you

6   calculate it.

7   Q   I don't understand what that sentence --

8   what you meant by that sentence. Could you explain

9   that for me?

10   A   Yes. Well, the minimum for the third

11 operator is five. The minimum of the non-zero value

12 is five. That's just an arithmetic fact.

13   Q   Okay. But does the 10.8 -- would the 10.8

14 apply to the zero in that situation and zeros just

15 like it in any other situation where the respondent

16 answered zero?

17   A   Well, let me just make sure I understand

18 this phrase you're using. Does it apply to the zero

19 in that situation?

20   Q   Could I apply it to the zero?

21   A   Could you?

22   Q   Yes.

23   A   Okay.

24   Q   I guess that's my question.

25   A   Now the situation where you're talking

1   about is operator three.

2   Q   Correct.

3   A   And religious, operator three, said zero.

4   Q   Correct.

5   A   Okay. And here we have 10.8 percent

6   and --

7   Q   And we wanted to figure out the threshold

8   for religious -- we wanted to figure out an adjusted

9   share for religious that was somehow related to what

10   you did for PTV. Could we do that?

11   A   Yes, we could do that.

12   Q   And would we start with the 10.8?

13   A   We'd start with any --

14   Q   Okay. So this applies -- this estimated

15   threshold then applies to all the zeros, whether it

16   was an automatic zero or not an automatic zero?

17   A   Well once again, I just don't understand

18   you. You must have something in mind. You keep

19   coming back to applies to these reported zeros.

20   This is the situation where the "X" is

21   here for the third operator, for religion.

22   Q   Right.

23   A   And the threshold is up here.

24   Q   Well, wait a second. The "X" is at zero

25   for religion. Isn't the "X" at zero for all those PTV

1   stations -- systems that just carry --

2   A   I'm sorry, I'm wrong.

3   Q   -- PTV stations?

4   A   That's not the "X." That's their view,

5   that's their attitude.

6   Q   Okay.

7   A   And there's no "X" in that situation?.

8   Q   There's no "X" in that situation?

9   A   There's no "X" because there's no actual

10 behavior. They didn't carry it.

11   Q   But they did carry it in all those

12 situations, didn't they?

13   A   No, excuse me, I'm sorry. Yes, the

14 presumption here is -- the presumption anyway is not

15 necessary that they carried it. It may be that they

16 had a mix of distant signals that had no religious

17 programming. And that's why they gave it a zero.

18   Or it may be that they had some religious

19 programming, but it wasn't very important. And my

20 view of that is this is -- in almost all cases, would

21 be a rounding phenomenon.

22   So it's really non-zero, but they round it

23 to zero.

24   Q   Okay. So are you saying that we can't

25 determine -- make an adjustment similar to the

1 adjustment that you made for the non-carried PTV

2 systems for that religious zero and other zeros that

3 were given by respondents?

4   A   Let's see, are you -- are you asking can

5 we apply this method which has been applied to dealing

6 with the automatic zeros for PTV to non-automatic

7 zeros --

8   Q   Correct.

9   A   -- for other systems?

10   Q   Yes.

11   A   Well, just a footnote there is -- no,

12 that's not necessary. Well, this method -- this

13 approach is just the general statistical approach to

14 estimating missing values.

15   So it could be applied to any. I mean,

16 it's not unique to PBS. It's a general method.

17   Q   What is a missing value? How would you

18 define that in general statistical terms?

19   A   The narrowest definition in statistics is

20 that you've gone out and made -- collected some data,

21 and -- or you intended to collect some data.

22   But in every survey, you -- people, you

23 try to reach them, and there are always some non-

24 respondents, people you couldn't reach.

25   So their -- their answers will be -- will

1   be missing: That's an example.

2   There can be different reasons for missing

3   data. Another reason would be hundreds of forms were

4   collected, and ten were lost in the trash can. That's

5   another reason for missing data.

6   There's a reason here for missing data

7   that 146 respondents were never asked. So we can view

8   them as missing.

9   The broadest concept of missing in

10   statistics is this: that the whole of statistical

11   inference is about missing values.

12   When you think of -- take a random sample,

13   like this survey or the Nielsen surveys, a random

14   sample, and what are you trying to do with -- in

15   statistical inference from a sample to a larger

16   population, which is really what you're interested in?

17   What's the average or some other measure

18   for that whole population? That's what you want to

19   estimate from the sample.

20   Well, the sample is the data that you

21   have, and all of the other people that you didn't ask,

22   their -- their values are missing.

23   So all the statistical inference can be

24   understood conceptually as estimating missing values

25   because in essence, when you make an inference from

1   the small, finite sample out of the total population

2   that you have, that inferences can amount to inferring

3   a value for the average of all those people that you

4   didn't interview or didn't select on the sample.

5   Q   Now to make that inference, when -- would

6   you have to know whether the people that had the

7   missing data, if you will, were the same or pretty

8   close to the same as the people for whom you have

9   data?

10   A   Well, that's what -- that's what random

11   sampling attempts to do. It doesn't always succeed,

12   but it attempts to equilibrate those two groups.

13   And in this situation, we don't have a

14   random sample. The people who were asked, the

15   operators who were asked about PBS, those 27, are

16   definitely not a random sample from the 173.

17   But conceptually, we can still carry

18   through many of the same ideas in statistical

19   inference to that situation, even though it's not a

20   random sample.

21   Q   But are you saying that the Bortz Survey

22   didn't have a random sample?

23   A   No, I'm not. The 173, for example for

24   1990, was a random sample.

25   Q   And isn't one of the characteristics of

1   the universe here the number of systems that carry

2   public television stations as a distant signal?

3   A   Yes.

4   Q   And do you know what roughly percentage of

5   all cable system, Form 3 cable systems -- do you know

6   what Form 3 cable systems are, first of all? Do you

7   know that there are the largest cable systems and then

8   there are smaller-sized cable systems?

9   A   Yes.

10   Q   Do you know what -- do you understand that

11   Bortz only sampled the Form 3 system universe?

12   A   I do.

13   Q   Do you know what percentage of the Form 3

14   universe cable systems carried a distant public

15   television station?

16   A   I don't know that number. I've looked at

17   -- I've heard about instances of carriage and I

18   understand --

19   Q   Do you know what the instances of carriage

20   --

21   A   -- public television is.

22   Q   Okay. Do you know it on that basis?

23   A   Well, I understand it to be seven percent.

24   Q   Do you know whether the Bortz Survey has,

25   in its entirety of the sample, measures that

1   characteristic of the Form 3 universe closely?

2   A   Does it measure?

3   Q   Right.   In other words, is one

4   characteristic of the Bortz sample a close

5   approximation of the amount of public television

6   distant signal carriage in the Form 3 universe?

7   A   You're talking about instances of carriage

8   now?

9   Q   Yes.

10   A   I don't know. I haven't compared the two.

11   Q   Okay. But the sample of 27 or 22 for 1990

12   that you've used, that's 100 percent carriage of

13   public television distant signals, correct?

14   A   In the sense that those operators carried

15   a whole signal --

16   Q   All of them -- all of them carried a

17   public television distant signal --

18   A   Oh yes.

19   Q   -- correct?

20   A   Right.

21   Q   And you're projecting that population to

22   the rest -- the characteristics of that to the rest of

23   the population in the sample. Is that right?

24   A   Well, I wouldn't -- I wouldn't -- I

25   wouldn't describe it that way because it doesn't rest

1   on some assumption that they're the same.

2   Q   Okay.   Why doesn't it rest on some

3   assumption that they're the same?

4   A   Because the whole approach here deals with

5   and recognizes explicitly the differences between the

6   27 and the 146.

7   Q   What differences does it recognize?

8   A   Let's see, this -- well, we're using the

9   results from the survey about the 27.   That's how we

10   have all of those results.   And that's -- those

11   datapoints are -- I would say that the principal

12   driver of the answer.

13   Q   Okay. Could you turn back to Chart 1 that

14   you drew yesterday and explain that for me?

15   CHAIRPERSON JIGANTI: Mr. Lane, would it

16   be --

17   MR. LANE: Sure.

18   CHAIRPERSON JIGANTI: -- all right to take

19   a break?

20   MR. LANE: Take a break.

21   CHAIRPERSON JIGANTI: We're going to take

22   a ten minute recess now, Dr. Fairley.

23   (Whereupon, the proceedings went off the

24   record at 10:39 a.m. and resumed at 10:58 a.m.)

25   CHAIRPERSON JIGANTI: Apparently, sir,

1   you've invoked a lot of discussion.

2   (Laughter.)

3   BY MR. LANE:

4   Q   Now, I wanted to go back to Chart 1

5   because I wanted to figure out how you determined or

6   how you -- how did you use the 22 systems for 1990 to

7   come up with the numbers that you report in Table 1?

8   (Pause.)

9   BY MR. LANE:

10   Q   The 22 numbers -- is this correct: the 22

11   numbers are the only numbers from which you can get

12   both what you've termed on Chart 1 as "the PBS share"

13   and the threshold? Is that right?

14   A   That's right. Well, the 27 numbers --

15   Q   Twenty-seven numbers.

16   A   -- you have the threshold measurement, the

17   minimum value, and you also have an observed response.

18   Then for the 146, you have a threshold

19   value, but you don't have an observed response.

20   Q   Right.

21   A   So you have three out of four of the --

22   Q   But is it fair to say that you figured the

23   PBS share for the 146 based on the ratios that you

24   developed from the 27 responses?

25   A   No, that would be misleading.

1   Q   Okay.

2   A   What I'm trying to -- what's done is not

3 to -- you were talking about projection before. It's

4 not projecting these, to the extent that would be the

5 word.

6   It's using them, but using them I think

7 appropriately to measure what -- what these are, what

8 their average value is. And their -- the measured

9 average value, as you know from column 4 on Table 1

10 for 1990, is 4.4.

11   So we're here at 4.4 where that's the --

12 that's the result of the work, is to estimate an

13 average value for these 146 at 4.4 percent, whereas

14 the observed percent for the 27 was the share of --

15 the average share of 15.7 percent we have here.

16   So you can see there's no --

17   Q   It's actually 15.4, but --

18   A   Oh, thank you, 15.4. There's no

19 mechanical projection. That word is used in other --

20 in a sampling context.

21   CHAIRPERSON JIGANTI: That's 22 or 27, 27

22 right?

23   THE WITNESS: Twenty-seven.

24   ARBITRATOR WERTHEIM: I understood you

25 just to tell us that the 4.4 in 1990, as shown in

1   table -- or column 4 of your Table 1, is the average

2   value attributed to PBS for the 146.

3   But those 146 hadn't been asked how they

4   value PBS.

5   THE WITNESS: That's right. That -- the

6   --

7   ARBITRATOR WERTHEIM: So I understood from

8   your testimony yesterday that you got that figure, the

9   4.4, by some algebraic calculation based on your

10 columns 2 and 3.

11   THE WITNESS: That's right.

12   ARBITRATOR WERTHEIM: I didn't quite

13 follow that then and I don't know whether it's

14 pertinent at all to Mr. Lane's question. But at some

15 point, I hope we will come back to that.

16   THE WITNESS: Yes, I think it is -- I

17 think it is important to clarify that. I'm going to

18 pull out here, the 6.1 because that's the estimated

19 average for all 173.

20   And the way the model works, this is the

21 unknown that you solve for. The 6.1 is the unknown.

22 So just as a matter of procedure, that's the first

23 number you get out. That's the answer.

24   That is, you put it in that framework.

25   ARBITRATOR WERTHEIM: But I thought that's

1   what you ended up with?

2   THE WITNESS: You end -- this is what you

3   end up with from the model. You estimate this.

4   BY MR. LANE:

5   Q   But don't you have to start out with the

6   4.4 and not the 6.1?

7   A   It doesn't matter. You can start -- you

8   could start here and go to here and you can start here

9   and go to here.

10   MR. HESTER: Dr. Fairley, when you say

11   "here" and "there" --

12   THE WITNESS: Oh, okay.

13   MR. LANE: Well, if it doesn't matter --

14   (Laughter.)

15   THE WITNESS: You could -- you could just

16   -- as a matter of fact, the way I did it was to say an

17   average for all 173 is the unknown. Call that "Y."

18   And then after we get that answer, since we know the

19   average for the 27, and we know the average for the

20   173, it's a simple matter of arithmetic to find the

21   average for the 146.

22   So that's what I said -- I factored that

23   out and that's what I meant. So 4.4, I backed out.

24   However, I could have done the whole thing in the

25   other direction.

1   I could have said well, let "Y" be the

2 average value for the 146. Get that answer. That

3 answer would be 4.4. Then I could calculate 6.1 as,

4 in fact, the weighted average of 4.4 weighted by 146

5 over 170 -- that period and 15.4 weighted by 27 over

6 173.

7   BY MR. LANE:

8   Q   But for the 146, you didn't know anything

9 about the "Y" value, or you knew it was zero and you

10 wanted to make it something, right?

11   A   I didn't -- I didn't know what the value

12 was because they weren't asked.

13   Q   Right. So when you started out with the

14 146, you knew all their "X" values, and you were

15 trying to determine their "Y" values. That's one way

16 of looking at this, correct?

17   A   Correct.

18   Q   Okay. So humor me, and we'll -- let's

19 look at it that way. How did you go about determining

20 the "Y" values for those 146?

21   A   As I said yesterday, it wasn't necessary

22 and I did not attempt to determine a "Y" value

23 attached to each and every one because that wasn't

24 necessary.

25   All I attempted to do was to find their

1   average, the "Y" value.

2   Q   How did you -- how do you do that?

3   A   Okay, you -- you see a part of reality

4   here. You see 27 points here.

5   MR. HESTER: Dr. Fairley, when you say

6   "here," you just -- if you could just articulate what

7   you're referring to.

8   THE WITNESS: I'm sorry. I'll try to keep

9   that in mind for the benefit of the transcript.

10   MR. HESTER: Right. We may have to go

11   back and look at this.

12   BY MR. LANE:

13   Q   You have the 27 points that are both "X"

14   and "Ys" for the PBS respondents, correct?

15   A   Right.

16   Q   Okay. And then how did you use those 27

17   points to infer something about the 146 where you only

18   had an "X"?

19   A   Okay, I'll give a brief synopsis of what

20   I said in a lengthier way yesterday.

21   We're fitting a model -- a model is a

22   description of the -- a model of frequencies, relative

23   frequencies is a description of the values of the "Ys"

24   and the "Xs" together.

25   What we're trying to do, in effect, is

1   show the frequencies of "Y" and "X" combinations in

2   the whole -- this whole quadrant for "Y" and "X."

3   We only observe the half of the quadrant

4   above the 45 degree line. This is -- this is the

5   unknown.

6   You could -- you can play the game. This

7   is something you do in statistics to think about the

8   theory is that there are these "Xs" and then you put

9   a piece of cardboard up here and you cover them up.

10   You can't see them.

11   And now you say, all right, let's attempt

12   to estimate them. And you go through the procedure

13   I'll describe just now to do that.

14   And then you could take the cardboard off

15   and see how well you did that. And that's the

16   position we'd like to be in, just to take away a piece

17   of cardboard, but we're not.

18   And in fact, that kind of a procedure is

19   exactly what's -- or at least it's an illustration of

20   what's done in the statistical theory to validate the

21   model that I used, to say yes, this is a sensible way

22   to do it.

23   You are going to get an unbiased answer by

24   using this modelling and this method. It's not going

25   to be exactly right, but you have reason to believe

1   that the errors are constrained and that you're

2   hitting on the average of the right -- the value

3   you're looking for.

4   So let me give this synopsis: I started

5   out by saying well, we observed all these "X" values,

6   so we can -- we can fit a model to the "X" values

7   alone. That's the geometric model.

8   We call the next chart where it

9   illustrated the run of the frequencies in actuality

10 and a particular model. That turned out to be

11 reasonably good.

12   Then the next step is to have a model for

13 the "Ys." That turned out to be -- the geometric

14 turned out to be well for that, but it's a geometric

15 with a different mean, a much smaller mean than the

16 one for the "Xs."

17   And then the final step of constructing

18 the model is to say well, how do we -- we have these

19 probabilities for "Ys" alone and for "Xs" alone. How

20 do we distribute them for combinations of "Xs" and

21 "Ys?"

22   For that, I used the pro rata model or the

23 independence model for doing that. Now the model is

24 complete. You can find the probability of a point

25 being in any area, and in particular in these areas

1   which are the unknowns.   This is the unknown area

2   where only the "Xs" are known and the "Ys" are not.

3   Now having the model of the relative

4   frequencies of "Xs" and "Ys" everywhere and now write

5   the model as a mathematical formula. And you write

6   down an expression for what's called the likelihood of

7   the data you observed.

8   You can calculate the likelihood of

9   observing each datapoint. For example, this model

10   puts very little probability up here.

11   MR. HESTER: When you say "up here" --

12   THE WITNESS: I'm sorry, up -- travel

13   along the 45 degree line a distance of 30, 40, 50

14   percent on the "X" or "Y" scale. And up in that

15   region there's very little probability attached.

16   So you're not -- under the model, you're

17   not going to therefore estimate implicitly that there

18   are many points here, or maybe none.

19   Whereas down here, the model puts, by far,

20   the greatest weight on being right down here between

21   zero and five and zero and ten for both "X" and "Y."

22   That's where the model puts the weight.

23   You recall the geometric starts at a maximum of zero

24   and goes down -- a maximum of one actually, and goes

25   down for both "X" and "Y." And that's where most of

1 the probability is attached.

2 So to return to the likelihood, you write

3 down the expression called the likelihood of the

4 observed data. And that involves the likelihood of

5 observing these "XY" points that you did and these "X"

6 points, but not these "Y" points.

7 And then you have an unknown in that

8 model. That is, you define the model for the whole

9 "XY" quadrant, but you have an unknown for the average

10 value that's summarized in the term of the model

11 called a parameter that is the average value of these.

12 Or actually, as I mentioned before, the

13 term in the model or the parameter I actually used was

14 the average or all the points. But I could have used

15 a term or a parameter that was the average for these.

16 So the point is you have one unknown in

17 this likelihood, and then the procedure for finding

18 the best estimate, so-called -- which is called a

19 maximum likelihood estimate, is illustrated if you

20 would turn to Exhibit 39, the graph there.

21 ARBITRATOR WERTHEIM: Excuse me. Before

22 we look at that, the -- you say you used an average

23 for all of the dots.

24 THE WITNESS: Right.

25 ARBITRATOR WERTHEIM: You could have just

1   used the average for the ones below the threshold.

2   THE WITNESS: Right.

3   ARBITRATOR WERTHEIM: Did you, as an

4   alternative, check the average for those to the right

5   of the threshold and see whether the result coincided

6   with or came close to your 4.4 result using the other

7   method?

8   THE WITNESS: We're looking to the right

9   of 10.8?

10   ARBITRATOR WERTHEIM: Whatever you were

11   pointing to when you made that spot a moment ago. You

12   said you did an average of all the -- of all those

13   shown on the chart.

14   THE WITNESS: Right.

15   ARBITRATOR WERTHEIM: And you could, as an

16   alternative, have limited yourself to those to the

17   right of the diagonal line.

18   THE WITNESS: Right.

19   ARBITRATOR WERTHEIM: Now I'm asking, did

20   you check yourself by actually making a calculation

21   just of those to the right of the line to see whether

22   the element which was the same result that you got by

23   your method?

24   THE WITNESS: I don't see how I could do

25   that because I don't have the "Y" values to the right

1   of the line.

2   ARBITRATOR WERTHEIM: I thought you said

3   that you could have worked with that group instead of

4   with the whole group.

5   THE WITNESS: Oh, I hadn't thought at all

6   about how to do that. This is straight-forward to do

7   what I did, and that's all I needed to do.

8   ARBITRATOR WERTHEIM: Well, does this

9   relate to your statement that you could either have

10   started with a 6.1 and 15.4 and backed out to 4.4? Or

11   alternatively, you could have started with a 15.4 and

12   a 4.4 and backed out to 6.1?

13   Are those two alternatives that correspond

14   to what I was just asking you about?

15   THE WITNESS: I don't think so. You were

16   asking about some kind of cross-check. After I do all

17   of this, is there some other way to check the numbers?

18   Is that what I understand?

19   ARBITRATOR WERTHEIM: Well yes, because

20   you said you had a choice of two ways of doing it and

21   you chose one. I meant to ask you had you -- have you

22   see what the result would have been had you chosen the

23   other?

24   THE WITNESS: By "two ways of doing it,"

25   do you mean start with the overall average or to start

1   with the average for the 146? Are those the two ways?

2   ARBITRATOR WERTHEIM: I think that's

3   right. I think that's what you were referring to.

4   THE WITNESS: Okay. No, I didn't do that

5   because I know the answer. It's a mathematical fact.

6   It's not an empirical property of these data.

7   It's just -- you can use one parameter or

8   the other. They're connected by a simple

9   relationship. If you estimate one, I know from the

10   properties of the mathematics, that you'll get exactly

11   the same answer for the other as if you did it in

12   reverse order.

13   ARBITRATOR WERTHEIM: Okay, thank you.

14   I'm sorry to keep interrupting, Mr. Lane.

15   BY MR. LANE:

16   Q   Is what -- is what you're saying that --

17   let's say of the 27 -- let's us 20 -- just pretend

18   it's 22 because then I can figure it out.

19   Let's say 11 of the 22 fell between 20 and

20   30 on the "Y" line, okay?

21   A   Yes.

22   Q   So 50 percent fell in between 20 and 30 on

23   the "Y" line.

24   A   Contrary to fact.

25   Q   Contrary to fact, but just so it's simple.

1   A   Okay, okay.

2   Q   Do you want to do 14 out of 27? I just

3   want to make an easy percentage, 50 percent between 20

4   and 30?

5   A   Okay.

6   Q   And then if I looked across the bottom

7   line, and out of the 173, half of those fell also

8   between the 20 and 30 line on the "X" line, okay?

9   A   Yes.

10   Q   So are you saying then you would put -- of

11   the 146 that you didn't know, you would place them --

12   you would give them a value between 20 and 30 on the

13   "Y" line because that's where the probability --

14   A   No.

15   Q   Okay.

16   A   No, you give them a value between zero and

17   the threshold, between zero and the 45 degree line, as

18   it -- the various --

19   Q   All right. If you knew that 50 percent of

20   the known observations were between 20 and 30 on the

21   "Y" line, how would you use that to tell you something

22   about where the "Y" value for the 146 are?

23   A   Well, you need -- you need all the

24   information. You need to know where all the "Ys" are.

25   So if 50 percent are here --

1   Q   The other 50 are between 20 and 10.

2   A   And not between 10 and zero?

3   Q   No, just to make it simple.

4   A   Okay. All right, so we know the full distribution there.

6   Q   How would you allocate the 146 for their "Y" value for the 146 in that situation?

8   A   I see, okay. Well, we go to the geometric distribution for the "X" that's been fitted here. And we find -- we find under that distribution what frequency -- what's the relative frequency of having an "X" value between 20 and 30?

13   And we look at this chart, and it's 20 out of 173.

15   Q   Okay. Now you already know where 27 of those lie on the "Y" line, right?

17   A   Yes, but that doesn't matter.

18   Q   Okay.

19   A   I'm just going to use that on that value. So that's something over ten percent. Let's go with 12 percent.

22   So you have a predicted 12 percent of -- you have a model 12 percent in this range for the "X" values.

25   So you would multiply 12 percent times --

1 let's see, this region --

2 Q   The region between 20 and 30 percent on

3 both the "X" and the "Y" lines.

4 A   Yes, so that's a square region --

5 Q   Right.

6 A   -- entirely lying below the 45 degree

7 line.

8 Q   Okay.

9 A   So under the pro rata model --

10 Q   And that's what you use, the pro rata

11 model?

12 A   Yes, assign 12 percent of 50 percent, so

13 six percent of them would probably go here.

14 Q   And then you --

15 A   Of course --

16 Q   -- then you did all other squares like

17 that on the whole "XY" chart. Is that right?

18 A   Exactly.

19 Q   And then that -- the average of that

20 produced the 6.1. Is that a simplistic way to think

21 about this?

22 A   Well, it's -- these numbers, the

23 percentages in the squares, I'll show you the relative

24 frequency of where the "XY" values are in the whole

25 chart.

1   Those are just the probabilities.

2   Q   And how did you take what you knew was the

3   six percent in that square plus all the other percents

4   in all the other squares? What's the next stop to

5   getting to the 6.1?

6   A   Okay, the next step is to write down this

7   likelihood function, which gives you the probability

8   of observing all of the data that you do observe. And

9   including one unknown term, as I did it, standing for

10 the true, but unknown, average of all the "Ys."

11   Q   Okay, so what did you do? You took six

12 percent. You added up all the other squares, and you

13 some -- tell us mathematically how you translate that

14 to 6.1 percent.

15   Is there a simple way to tell us that?

16   A   The simplest --

17   Q   Is it a --

18   A   -- thing I can tell you is that -- I was

19 getting ready to explain one part of that. I don't

20 know if this will answer -- you know, give you a

21 better idea.

22   But in Exhibit 39, this is a graphical

23 description of the maximum likelihood method, which as

24 I mentioned before, is the most common theoretical

25 method or the method of mathematical statistics for

1   deriving at estimates of unknown quantities in models

2   like this or any model.

3   And what this shows is we graphed the

4   numerical value of the likelihood function depending

5   on the choice that you make for the average PBS share.

6   And recall that I said the only unknown

7   value in this likelihood function is this average

8   share.

9   So once you supply a number to it in that

10   function, you can calculate the numerical value of

11   that function.

12   Q   Do you -- how do you pick that number? Do

13   you just pick it out of the air?

14   A   Well here in this graph, I have picked all

15   of the numbers with a share between five and someone

16   over 6.5. And then you see the result.

17   I've plotted for each of those choices the

18   likelihood. And that's understood as the likelihood

19   of observing the data that we actually got if the --

20   if you assume the true unknown average share is that

21   number.

22   So for example, if you assume the true

23   unknown share is 5.0, you plug that into the unknown

24   term and the likelihood functions. You then grind out

25   -- the computer grinds out a number. And I've plotted

1   that number here as the lowest point on the left of

2   this graph.

3   So it's, you know, by looking at the "X"

4   axis, it's something less than a half. Let's say .4.

5   By the way, the scale here is arbitrary.

6   The   actual   numbers   are   different.   They're

7   disproportional, these numbers.

8   So now you can see that .4 doesn't give

9   you as high a likelihood as if you go up to 5.5. And

10   you say, well let's assume it's 5.5 for the overall

11   average here.

12   We'll travel up and the height or the

13   ordinate of the graph at that point looks to me to be

14   about five. So it's actually, you know, over ten

15   times as high.

16   So there's substantially more evidence for

17   5.5.

18   And finally, you can see where is the

19   maximum -- where do you have the maximum likelihood

20   for -- for which value of the unknown makes it most

21   likely that you would see the data you see?

22   And that value looks to me, you know just

23   by eye, to be maybe 5.7. This is an illustration.

24   It's not exactly the one that was used here, which

25   showed the maximum at 6.1.

1   So you can see that that's how you pick

2   out the answer. That's how 6.1 was picked out, that

3   value for the unknown term that maximizes this

4   likelihood.

5   Let me just try to give you an idea of

6   that notion with respect to this graph of the maximum

7   likelihood. If -- let's say, to the extreme, that you

8   assumed the average share for PBS for all the

9   respondents was 30, okay?

10   Q   Could I just stop you? Let me just see if

11   I can give you a simple example that I would

12   understand.

13   Let's assume that half the "Y" values were

14   between 10 and 20, and the other half between 20 and

15   30, and on the "X" axis, the same thing.

16   So you had four boxes, and I take it each

17   one of them would be 25 percent. You have half --

18   A   Oh, okay.

19   Q   -- between 20 and 30 and half between 10

20   and 20 on the "Y" axis in the same --

21   A   Right, right.

22   Q   -- exact proportion on the "X" axis.

23   A   Okay.

24   Q   All right. How would you then determine

25   this number, the equivalent of 6.1 for that example?

1   A   Okay, well -- of course, just to be clear,

2   that immediately --

3   Q   It's a total hypothetical.

4   A   It's a total hypothetical --

5   Q   Right.

6   A   -- that is contradicted by these.

7   Q   It has nothing to do with the data --

8   A   Okay.

9   Q   -- that you analyzed. But it just is an

10   easy way for -- maybe for, at least me, to understand

11   what's going on here.

12   A   Okay. Well, we fit a model to the -- to

13   the "X" values, where they were. We fit a model to

14   the "Y" values where they were. And then we fit this

15   pro rata model to their combinations.

16   So now we can write down the probability

17   that a datapoint would be at any given place.

18   Q   Okay.

19   A   And so then we would write down

20   expression, not only for the probability of one

21   datapoint, but the probability of simultaneously

22   seeing all the datapoints that you actually saw.

23   That's the key.

24   And you seek to maximize that. You seek

25   to -- the idea is find the most plausible. The most

1   reasonable answer is the one that makes most likely

2   what you actually observed.

3   Q   Okay. So in other words, we need to -- we

4   don't need to know, but there's another step which is

5   not shown in your testimony. And that is these

6   models, and they have to be fitted however the

7   datapoints are.

8   And the models are some sort of formula?

9   And then you're just --

10   A   Yes.

11   Q   -- trying to estimate where the formulas

12   intersect?

13   A   That's right.

14   Q   Okay. So it's sort of like a demand and

15   supply curve type of situation? We have a curve going

16   up on one side and a curve -- and you're just seeing

17   where the "X" meets. And that's your equilibrium

18   point?

19   Is that sort of the same idea of what

20   you're doing here?

21   A   Yes, insofar as that's a model too and you

22   have an equation for the demand curve and a equation

23   for the supply curve, and then you find the

24   intersection and solve for --

25   Q   But that's what -- that's how you did this

1   here, similarly?

2   A   Similarly, yes.

3   Q   Okay.

4   A   Instead of finding an intersection, we're

5   finding a maximum.

6   ARBITRATOR WERTHEIM: Dr. Fairley, with

7   respect to your Exhibit 39, the bar chart on the

8   maximum likelihood message, I understood you to tell

9   us yesterday that you got this 6.1 for 1990 as the

10   product of a mathematical formula that you described

11   as a weighted average of the queried shares and the

12   estimated average of the non-queried shares.

13   And that was your formula that we

14   discussed for some time, the 27 times 15.4 times 146

15   times zero multiplied by 173.

16   Now I followed how that formula resulted

17   in your figure of 6.1. Are you now telling us that

18   you got the 6.1 method demonstrated by your bar chart,

19   or is that just an independent way of trying to

20   confirm your results?

21   THE WITNESS: Both -- both methods are

22   consistent, and they're just to be used as the same

23   elephant. In fact, it's -- what I believe I said was

24   that this is the way I actually got it, that is the

25   Exhibit 39 approach.

1   And then once you get it, you can show

2 that 6.1 is the weighted average of 4.4 and 15.4. So

3 once you have the 6.1, you use that in conjunction

4 with the 15.4 to back out the 4.4.

5   ARBITRATOR WERTHEIM: But it puzzles me

6 that you would have originally gotten this through

7 your chart because the mathematics you described,

8 although a little complex for a us, probably could

9 have gotten the result in a matter of seconds.

10   Whereas it must have been quite laborious

11 to plot all the data of your actual bar graph.

12   THE WITNESS: But starting out, I couldn't

13 find either 6.1 or 4.4 because all I had was 15.4 for

14 the average of the 27.

15   ARBITRATOR WERTHEIM: Yes, but you also

16 knew you have 146 and a zero, and that the total was

17 173. And as you described it to us yesterday, that's

18 fairly simple mathematics to reach a product of 6.1.

19   THE WITNESS: No, that gives you a value

20 of 2.7 when you --

21   ARBITRATOR WERTHEIM: Okay. And then you

22 relate that to the 15.4 in order to get 6.1?

23   THE WITNESS: No, I relate the 4.4 to

24 15.4. 6.1 is the weighted average of 4.4 and 15.4.

25   ARBITRATOR WERTHEIM: Well in order to get

1   to your 4.4, you first had to have 6.1 and 15.4,

2   didn't you?

3   THE WITNESS: Yes. I had 15.4 right from

4   the start from the Bortz, and the 6.1 I got only after

5   I went through the modelling and setting up the

6   equation and solving for the maximum to get 6.1.

7   ARBITRATOR WERTHEIM: Well, is it just

8   coincidence that -- or I guess I'm asking you why you

9   went through all the trouble of your maximum

10   likelihood method when you could have gotten the same

11   results from an algebraic calculation?

12   Or are you telling me that you didn't have

13   the 4.4 data that you would need form that calculation

14   until after you had done the bar chart?

15   THE WITNESS: That's right. I didn't have

16   the 4.4 at all. Because the 4.4 is the average of the

17   heights of these points and the "Y" values of these

18   points.

19   And by assumption, we then add those

20   points.

21   ARBITRATOR WERTHEIM: And the 4.4 is the

22   key figure for all of the calculations you made in

23   Table 1. Is that right?

24   THE WITNESS: You can say this --

25   ARBITRATOR WERTHEIM: Once you got the

1   4.4, everything else could easily be calculated.

2   THE WITNESS: That's true.

3   ARBITRATOR WERTHEIM: And the 4.4, do I

4   understand you correctly, rests entirely upon the

5   maximum likelihood message illustrated in your Exhibit

6   39?

7   THE WITNESS: Yes, both statements are

8   true. Now the way -- and I could have done it in just

9   that sequence. In fact, I did it in a different

10   sequence.

11   I first found the 6.1 through the maximum

12   likelihood. And then as a matter of arithmetic, I

13   backed up to 4.4.

14   So the 6.1 can also be viewed as the most

15   important in that sense. They're equally important.

16   CHAIRPERSON JIGANTI: Excuse me just one

17   moment.

18   (Pause.)

19   CHAIRPERSON JIGANTI: Dr. Fairley, can you

20   articulate a formula for acquiring the number 4.4 --

21   THE WITNESS: Okay.

22   CHAIRPERSON JIGANTI: -- from beginning to

23   end so that I can see it?

24   THE WITNESS: The Chart 5 --

25   CHAIRPERSON JIGANTI: And write down the

1   equation for 6.1.

2   (Pause.)

3   THE WITNESS: Okay, there is an equation,

4   a linear equation, with one unknown and solve that for

5   "Y."

6   CHAIRPERSON JIGANTI: I don't know that

7   Mr. Lane can see you --

8   MR. LANE: I can see fine, thank you.

9   CHAIRPERSON JIGANTI: And I need a moment

10   to assimilate what you have --

11   BY MR. LANE:

12   Q   I think Judge Jiganti's question was how

13   did you get the 6.1? I mean, you've assumed the

14   answer there, haven't you?

15   A   Well yes, that's right.

16   Q   You've assumed -- I'm sorry, he asked you

17   how to get to 4.4, and you've assumed with the 6.1 the

18   answer to that question.

19   A   Well, to get to 4.4 -- you can go either

20   way. I --

21   CHAIRPERSON JIGANTI: Mr. Lane, let me

22   bring it down in order --

23   MR. LANE: All right.

24   CHAIRPERSON JIGANTI: -- and I think

25   that's going to be the next question, I suspect. But

1 okay, Doctor, please --

2   ARBITRATOR WERTHEIM: That's how you got

3 your 6.1?

4   CHAIRPERSON JIGANTI: That's how you got

5 your 4.4?

6   THE WITNESS: 4.4.

7   CHAIRPERSON JIGANTI: This is how --

8   THE WITNESS: Yes, if I start as I did, in

9 fact, my actual sequence was to get the 6.1.

10   CHAIRPERSON JIGANTI: Doctor, there is a

11 mathematical formula for 4.4. You do things, you

12 know, your way. You start off on a level that I can't

13 comprehend.

14   I'm trying to bring it down to my level.

15 And what I need to see is that I assume that it breaks

16 down to a mathematical formula. I would be more

17 comfortable if I could see the mathematical formula

18 and that's my approach to the --

19   THE WITNESS: Okay.

20   CHAIRPERSON JIGANTI: Now the question is,

21 how did you get to 4.4? And that's the equation that

22 you're giving me now. Is that correct?

23   THE WITNESS: I can solve this for "Y" and

24 that will be the --

25   CHAIRPERSON JIGANTI: That formula, first

1   of all, is -- is that what you're going to do? You're

2   going to show me now how the mathematical equation for

3   4.4 or can't that be done?

4   THE WITNESS: I'm going to show you how to

5   get 4.4 if you know 6.1.

6   CHAIRPERSON JIGANTI: Okay. You know what

7   the next question is going to be then. But you're

8   telling me about 4.4 right now. And we get to 4.4 by

9   starting off with 6.1, which the concept is

10   overwhelming right now.

11   If you're going to get to 4.4 -- well,

12   I'll let you do it. You know the question I'm asking.

13   I want to know the mathematical equation for 4.4. And

14   that's what you're showing me now, okay?

15   THE WITNESS: Yes.

16   CHAIRPERSON JIGANTI: Okay.

17   THE WITNESS: I'll show you right now.

18   CHAIRPERSON JIGANTI: Go ahead.

19   (Pause.)

20   THE WITNESS: The first step here is to

21   write an equivalent equation. We're bringing this

22   number -- this is just a number equal to 2.7 -- over

23   to this side.

24   MR. HESTER: Dr. Fairley, it's not going

25   to be clear when you say "this side."

1   THE WITNESS: Okay. When I bring --

2   CHAIRPERSON JIGANTI: Dr. Fairley, before

3 you start your explanation because I'm losing you

4 already because you have two formulas on the board, or

5 is that all the same -- that's not the same formula I

6 take it?

7   THE WITNESS: No, but they're equivalent.

8 That is, the answer to the top formula for "Y" is

9 known to the be the same as the answer for the next

10 formula for "Y" -- involving "Y."

11   In that sense, they're equivalent. In

12 order to find "Y," I have to shift around the terms in

13 this -- in this equation until I get the "Y" on the

14 left-hand side saying "Y" equals a number on the

15 right-hand side.

16   CHAIRPERSON JIGANTI: I'm less interested

17 in the explanation of it than the formula.

18   THE WITNESS: Okay.

19   CHAIRPERSON JIGANTI: And back -- and the

20 term you use, you back it out. I'll back it out later

21 when I --

22   THE WITNESS: Okay.

23   CHAIRPERSON JIGANTI: -- see what the

24 formula is.

25   THE WITNESS: Here's the formula.

1   (Pause.)

2   CHAIRPERSON JIGANTI: All right. Now,

3   could you articulate to me what you mean by "Y?"

4   THE WITNESS: Okay, "Y" is the average

5   share for the 146.

6   CHAIRPERSON JIGANTI: "Y" is the average

7   share of 146. That's your column 4. That's the

8   question I had.

9   ARBITRATOR WERTHEIM: That's what he's

10   solving for. He's trying to find out what is "Y."

11   CHAIRPERSON JIGANTI: Okay, so "Y" then --

12   the average estimated PBS share of non-queried,

13   correct?

14   THE WITNESS: Correct.

15   CHAIRPERSON JIGANTI: Okay. So that's the

16   formula for "Y" right there.

17   THE WITNESS: Yes.

18   CHAIRPERSON JIGANTI: And if you don't

19   mind, I'd like to see if I understand it.

20   ARBITRATOR WERTHEIM: Could you explain

21   why on your bottom line one of your multipliers is 173

22   over 146?

23   THE WITNESS: Yes, I'm drawing from the

24   second equation to the bottom equation. One way to

25   see what's -- to get there is to say --

1   ARBITRATOR WERTHEIM: Let's see it

2 mathematically, I guess, on your second one. So when

3 you switch it to the other side of the equals sign,

4 you --

5   THE WITNESS: Flips over. If you multiply

6 --

7   ARBITRATOR WERTHEIM: Well, why does it

8 flip over if it's being multiplied?

9   THE WITNESS: It's flipped over because to

10 solve for "Y" in the second equation, you divide the

11 right-hand side of that equation by 146 over 173.

12 When you divide something -- when you have one over a

13 division, it equals --

14   ARBITRATOR WERTHEIM: You're multiplying

15 the --

16   THE WITNESS: A reciprocal, yes.

17   BY MR. LANE:

18   Q   Dr. Fairley, now this comes back to Judge

19 Wertheim's question. If you solve that, isn't that

20 just multiplying 27 by 15.4 and dividing by 146? I

21 mean, why did we go through all these --

22   A   Oh, I see, because they -- sure, the 173s

23 cancel.

24   Q   Right. But I mean, that comes back to his

25 earlier question. Why didn't you just multiply 27 by

1 the known value and divide it by 146 instead of going

2 through all these calculations?

3   A   Well because we couldn't just cancel and

4 get the answer if we hadn't -- you didn't know what --

5 oh, excuse me. I haven't -- I'm sorry. I apologize.

6   This is -- this is not correct. I'm going

7 to bring this over so it becomes 6.1 minus this.

8   ARBITRATOR WERTHEIM: Maybe it would be

9 better if you start over.

10   CHAIRPERSON JIGANTI: Yes.

11   THE WITNESS: Yes.

12   ARBITRATOR WERTHEIM: And then you can

13 show us.

14   THE WITNESS: Okay, the chart 5', 6.1

15 equals 146 over 173 times "Y" plus 27 over 173 times

16 15.4. Okay, now we add the negative of this number to

17 both sides of the equation. That cancels it out here

18 on the right, and we have a negative of that

19 expression on the left.

20   So we can rewrite this equation as this

21 part of the right-hand side equal to that expression

22 I just mentioned, so let me do that.

23   (Pause.)

24   THE WITNESS: And now -- wait a minute.

25 Now you divide the right-hand side by 146 -- 173. Or

1   an easier way to see that is you multiply both sides

2   of the equation by 173 divided by 146.

3   When you do that on the left, that becomes

4   a one. When you do it on the right, it becomes the

5   multiplier that I had before.

6   (Pause.)

7   THE WITNESS: That's the correct

8   expression.

9   CHAIRPERSON JIGANTI: So your Chart 5'

10   shows the formula for the average estimated PBS share

11   of non-queried.

12   THE WITNESS: Right.

13   CHAIRPERSON JIGANTI: All right. Now in

14   that chart, you use the number 6.1, which is key to

15   what you're doing there. Is that correct?

16   THE WITNESS: That's right.

17   CHAIRPERSON JIGANTI: Can you show us the

18   formula for 6.1?

19   THE WITNESS: The likelihood function?

20   CHAIRPERSON JIGANTI: 6.1 is the adjusted

21   PBS average share -- PBS average?

22   THE WITNESS: Right.

23   CHAIRPERSON JIGANTI: Okay. Now is the

24   formula the first line of your chart there? I gather

25   that it is because you have 6.1 equals 146 over 173

1   times "Y" plus 27 and the rest of it there.

2   THE WITNESS: Yes. This is the numerical

3   evaluation of the maximum of a complicated

4   mathematical formula. So 6.1 comes from finding the

5   maximum just as this curve in Exhibit 39 is

6   illustrating.

7   CHAIRPERSON JIGANTI: I had difficulty

8   with that last night; I had difficulty with it this

9   morning earlier; and I'm having difficulty with it

10   now. But I see this a lot better.

11   Now we have -- in Chart 5', there are two

12   formulas. Am I correct? A formula for obtaining what

13   we have here as column 3, adjusted PBS average share.

14   And that would be your first line?   That's the

15   formula for 6.1?

16   THE WITNESS: Well, it's just the number.

17   It's not in itself a formula. 6.1 is, of course, just

18   a number.

19   ARBITRATOR WERTHEIM: But you got that as

20   a product of the other side of the equation.

21   CHAIRPERSON JIGANTI: Let's do it the

22   other way.

23   THE WITNESS: Oh no. No, this didn't come

24   from here. Forget this. We went through --

25   ARBITRATOR WERTHEIM: That comes from your

1 bar chart exhibit.

2   BY MR. LANE:

3   Q   If you didn't know 6.1, you couldn't solve

4 that equation, the chart 5', right?

5   A   That's right. We could write down the

6 equation. Maybe this would help.

7   CHAIRPERSON JIGANTI: I don't know where

8 we are now. Mr. Lane asked you a question and you're

9 answering some question and I don't know quite where

10 I am now and quite what you're going to do.

11   Now maybe it would be better off if we --

12 if Mr. Lane asked a question and I think perhaps he's

13 accurate. Mr. Lane, what was your question?

14   MR. LANE: My question is if you didn't

15 know 6.1, you couldn't solve that equation, if you

16 didn't have the number 6.1. Is that correct?

17   CHAIRPERSON JIGANTI: Solve what equation?

18   MR. LANE: The equation for "Y."

19   CHAIRPERSON JIGANTI: Okay. I just wanted

20 to make sure.

21   MR. LANE: You need to have 6.1 as, what

22 I call, a plug number. If you didn't have -- if you

23 put a different value --

24   CHAIRPERSON JIGANTI: We're on the same

25 track, Mr. Lane.

1   MR. LANE: -- for -- instead of 6.1, if

2 you put 9.15, you would come up with a different

3 value, would you not, for the "Y?"

4   THE WITNESS: Yes. Here at the bottom, I

5 have -- if you start out, say, 6.1 as an unknown "X,"

6 then we can't solve the equation for "Y" in terms of

7 "X."

8   So here you can see if you plug in 6.1 and

9 you get what we did. If you plug in 10, you'll get a

10 different answer and so forth.

11   ARBITRATOR FARMAKIDES: So the question

12 then is where is 6.1 derived? The bottom formula is

13 clear where you have two variables. Where does 6.1

14 come from? Where do you derive it, from your graph?

15   THE WITNESS: Well, the graph illustrates

16 the numerical --

17   ARBITRATOR FARMAKIDES: The graph in

18 Exhibit 39?

19   THE WITNESS: Yes.

20   ARBITRATOR FARMAKIDES: So you derive 6.1

21 from your graph.

22   THE WITNESS: Not literally. That is --

23   ARBITRATOR FARMAKIDES: Forgive me. My

24 question then is, where do you derive 6.1?

25   THE WITNESS: From the likelihood

1   equation. The sequence is we fit the model, which is

2   the description of where the relative frequencies are

3   for the "Ys" and "Xs."

4   Now, it's a model so these are not just

5   numbers. We have a formula which we can write down

6   for the probabilities of observing all the points that

7   we do -- all the data we do insert.

8   ARBITRATOR FARMAKIDES: So your 6.1 is an

9   assumption?

10   THE WITNESS: No, it's a result of a

11   calculation from a function that depends on all of the

12   data. It's not an assumption out of thin air.

13   ARBITRATOR WERTHEIM: Can you show us that

14   calculation instead of making us rely upon an

15   illustrative example in Exhibit 39? Can you show us

16   the mathematics by which you actually arrived at the

17   figure 6.1?

18   THE WITNESS: I can give you kind of an

19   overview. I'm sure I'll --

20   ARBITRATOR WERTHEIM: Well just to

21   complete your Chart 5', is it accurate to say that

22   above the horizontal line you've drawn at the bottom,

23   if you completed -- if you solved for "Y," you would

24   get 4.4?

25   THE WITNESS: Yes.

1   CHAIRPERSON JIGANTI: So then that's an

2 answer to column 4?

3   THE WITNESS: Yes.

4   CHAIRPERSON JIGANTI: All right. Now,

5 what we're -- I guess what we're striving for is

6 column 3.

7   THE WITNESS: Okay.

8   CHAIRPERSON JIGANTI: Column 3 is the 6.1,

9 adjusted PBS average share. And like the formula down

10 there, I'd like to know -- and maybe it's something

11 Judge Wertheim --

12   ARBITRATOR WERTHEIM: No, it's worth

13 putting it the record.

14   CHAIRPERSON JIGANTI: Okay. And is it

15 possible to do that?

16   THE WITNESS: It's possible to do it in

17 general terms. I'd have to go back and re-derive it

18 to get he -- all of the details. But I can hope I can

19 give you the essence of it.

20   CHAIRPERSON JIGANTI: Can you give us the

21 essence of it with terminology? You know, instead of

22 using numbers, can you use the terminology as to --

23 for the formula?

24   THE WITNESS: Yes.

25   CHAIRPERSON JIGANTI: If you could do

1   that, it would be helpful to me.

2   THE WITNESS: Okay, Chart 6 --

3   CHAIRPERSON JIGANTI: And I'm one-third of

4   the vote on this panel --

5   (Laughter.)

6   CHAIRPERSON JIGANTI: -- so I'm

7   significant.

8   ARBITRATOR FARMAKIDES: We all share the

9   same concern.

10   THE WITNESS: Okay, let's say we write

11   down a formula for the -- to start, step one is the

12   formula for other probability in observing the

13   datapoints that you observed.

14   CHAIRPERSON JIGANTI: That doesn't do

15   anything for me, Dr. Fairley. Now maybe it does for

16   the other members of the panel and the attorneys here.

17   ARBITRATOR WERTHEIM: What is the formula?

18   CHAIRPERSON JIGANTI: I don't understand

19   what you started saying about the datapoints observed.

20   THE WITNESS: Okay.

21   ARBITRATOR WERTHEIM: It would help if you

22   would try, as best you could, to reconstruct for us

23   what appears in Exhibit 39 as an illustrative example,

24   and to come as close as you can to giving us the

25   actual data, the actual graph that resulted in 6.1

1   THE WITNESS: Okay.

2   CHAIRPERSON JIGANTI: We've sure tossed a

3   lot of things at you, Dr. Fairley. Let me toss one

4   other thing at you.

5   Would it be helpful if we broke for lunch

6   at this time and meet back at one o'clock or sometime

7   a little bit later? I don't want you to get

8   indigestion.

9   Maybe you'll spin a theory that will make

10   us legally liable for it.

11   ARBITRATOR WERTHEIM: It might be better

12   to give you time to work on this in whatever forum

13   could be most helpful instead of trying to do it on

14   cross examination and in response to our questions off

15   the top of your head.

16   As we just saw a moment ago with Chart No.

17   5, when you try to do it that quickly, there's a

18   potential for some error to creep it.

19   So it might be better if we gave you the

20   time to do it more carefully.

21   THE WITNESS: I think I could do it now,

22   but I understand what you say. And --

23   CHAIRPERSON JIGANTI: Mr. Lane?

24   MR. LANE: It's fine with me.

25   CHAIRPERSON JIGANTI: Your   cross

1   examination is long, and you haven't even asked any

2   questions.

3   ARBITRATOR WERTHEIM: What we're trying to

4   understand are the steps, mathematical and otherwise,

5   that produced the number 6.1.

6   THE WITNESS: Yes, I understand.

7   CHAIRPERSON JIGANTI: Okay. Would it be -

8   - any other suggestions? We talked about breaking for

9   lunch now.

10   MR. HESTER: That's fine, Your Honor.

11   CHAIRPERSON JIGANTI: All right.

12   MR. HESTER: I almost wonder whether --

13   this would be highly irregular of course, but it would

14   be easier, I suspect, if I could step Dr. Fairley

15   through it.

16   But I know that's irregular. It's going

17   to be difficult, I think, to -- if I could examine him

18   through it, it might be easier for the Panel to

19   understand it and for all of us to follow what's going

20   on.

21   But I'm happy to just have him to do an

22   exposition.

23   ARBITRATOR WERTHEIM: That's fine with me.

24   CHAIRPERSON JIGANTI: Step him through it

25   at lunch --

1   MR. HESTER: Okay.

2   CHAIRPERSON JIGANTI: -- during lunch time

3   or a longer break if necessary. We usually break for

4   about an hour.

5   MR. HESTER: The other question I have is

6   do you know whether there's a copy machine around here

7   because I think there -- one of the problems is it's

8   a very long formula. And I wonder whether we should

9   almost try to get some copies made, if you wanted

10   really to see the -- all of the formula. We could try

11   to get you some copies over lunch.

12   But I wasn't sure if Leah was around to --

13   CHAIRPERSON JIGANTI: There is a place

14   right along the street here, immediately to the --

15   what direction is --

16   MR. HESTER: Okay.

17   CHAIRPERSON JIGANTI: Kinkos.

18   MR. HESTER: Okay.

19   CHAIRPERSON JIGANTI: Kinkos?

20   ARBITRATOR WERTHEIM: On Independence

21   Avenue?

22   CHAIRPERSON JIGANTI: Right on

23   Independence Avenue.

24   MR. HESTER: All right, okay.

25   CHAIRPERSON JIGANTI: Is an hour a

1   sufficient length of time?

2   MR. HESTER: That's fine, Your Honor.

3   CHAIRPERSON JIGANTI: Doctor -- and also,

4   I don't want to --

5   MR. HESTER: Yes, I think --

6   CHAIRPERSON JIGANTI: Is that going to be

7   enough time?

8   MR. HESTER: Yes, I think that should be

9   fine.

10   CHAIRPERSON JIGANTI: Okay. See you back

11   here at one o'clock.

12   MR. HESTER: Thank you.

13   (Whereupon, the proceedings went off the

14   record for a lunch break at 11:57 a.m. and resumed at

15   1:03 p.m.)

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A-F-T-E-R-N-O-O-N S-E-S-S-I-O-N

(1:03 p.m.)

CHAIRPERSON JIGANTI: There was a question pending for Dr. Fairley. Dr. Fairley, I suspect you have an answer to it.

THE WITNESS: Yes, I do. I wanted to see the equation I would use to find 6.1. I'm going to give that to you, but I want to -- in order to understand it, I want to go through just a few preliminaries.

First is just to clarify some terminology. If you go to Exhibit 38, those are the bar charts for the observed shares for PBS for those respondents that were queried, not including for 1995 respondents who gave a response of zero.

CHAIRPERSON JIGANTI: Excuse me. I think you said 1995. I know you meant 1990 from your --

THE WITNESS: Nineteen ninety.

CHAIRPERSON JIGANTI: Yes.

THE WITNESS: That's what I meant.

ARBITRATOR WERTHEIM: That's the 22 respondents?

THE WITNESS: Yes, 22 allotted here. The point I wanted to make here in case it wasn't clear is that this is only -- this doesn't -- this graph

1 doesn't include any information about the other 146.

2 So it's not all the data that is used in the model.

3 It's only part of it. And these are bar charts.

4 Going on to the next exhibit, 39, I may

5 have been a little confused about the reference to a

6 bar chart or not. I would not call this a bar chart.

7 I would call this a curve or a graph of a function.

8 And I'll just draw your attention to one feature.

9 This actually illustrates the results for

10 the average for 1992, which is 5.7. The average share

11 is 5.7 in '92. And that is about the maximum point

12 for that curve. So you should think of 1992 as being

13 illustrated by this function.

14 And I'll say something which perhaps would

15 be clear later, that you can't just draw this curve

16 freehand. You've got to do all the work setting up

17 the model, plugging in the data, and calculating the

18 functional values, and then plotting those functional

19 values as a curve.

20 So this is not something you -- this was

21 not just drawn freehand. This was a curve produced by

22 values coming out of the computer in which these

23 calculations were performed. So those are just -- I

24 just wanted to clear up a few minor points there.

25 And then I want to start out by saying --

1   I want to be clear about what we know and what we

2   don't know. We know 27 y's and 27 x's for the 27 PBS

3   respondents. We know 146 x's for the 146 operators

4   given automatic zero. What we don't know is the

5   fourth piece is the 146 y's. So we have one set of

6   x's, one set of y's, another set of x's, and we're

7   missing the fourth piece of the puzzle.

8   Now let me put up another chart here to

9   take the flow there.

10   CHAIRPERSON JIGANTI: To articulate the

11   146 x's, you're talking about the 146 automatic zeros?

12   THE WITNESS: Yes, that 146 operators were

13   given automatic zeros. We can find x's for them.

14   Those are the minimums in their rows, the non-zero

15   values for their rows.

16   Now, here's Chart 7. So we start out with

17   the data for 173. And this one consists of 27 x's and

18   27 y's, 146 x's, and we have one, two, three. What

19   we're missing is here, the 146 y's. This data is used

20   to get the answers for the averages.

21   The next step is to set up the probability

22   model for the -- for all these observations,

23   probability model.   You'll recall I started out

24   talking about the geometric model for the x's. Chart

25   2 showed that the model fit against the actual

1 distribution of the x's. And that's the first part of

2 the model. And right there we estimated 10.8 for 1990

3 as the average of the x's. So that becomes the

4 average for that geometric model. That's no longer an

5 unknown.

6   Now we go to --

7   CHAIRPERSON JIGANTI: Doctor, I'd like you

8 to repeat that. I just want to make certain.

9   THE WITNESS: Okay.

10   CHAIRPERSON JIGANTI: Would you state that

11 over?

12   THE WITNESS: I'll go back to --

13   CHAIRPERSON JIGANTI: The probability

14 model is where we are. The only question I had in

15 terms of probability model -- just repeat what you

16 said a moment ago.

17   THE WITNESS: About the x's?

18   ARBITRATOR WERTHEIM: The geometric model.

19   CHAIRPERSON JIGANTI: The geometric model.

20   THE WITNESS: Okay. There are three parts

21 to the probability model: a model for x's alone, a

22 model for y's alone, and a model for combinations of

23 x's and y's. And we know all the x's. They're the

24 minimums. They're the non-zero values to the 173

25 rows. And we plotted those in Chart 2.

1   This is the relative frequencies for

2   different values for those x's. So there were about

3   80 values of those minimums that fell between 1 and 9.

4   There were about 60 that fell between 10 and 19 and,

5   as drawn, about 20, between 20 and 29 and so forth.

6   There's 173 x's to account for. And so these solid

7   bars have to add up to 173.

8   ARBITRATOR WERTHEIM: So that's how you

9   arrived at the average of 10.8?

10   THE WITNESS: That's right. And in order

11   to build a model, we used that 10.8 as the mean of the

12   geometric distribution, which was fitted to the data.

13   What the dotted lines show are the probabilities

14   predicted under that probability model, which has a

15   mean of 10.8.

16   So I'm now going to replace the bars,

17   which are the actual values, in effect, with the

18   dotted lines, which are model values. And, as I

19   mentioned before, here is one place where you

20   introduce a simplification that's obviously not

21   exactly equal to the data.

22   All modeling involves some simplification

23   in order to get out an answer, which you can then

24   defend. So --

25   CHAIRPERSON JIGANTI: Doctor, wait just a

1 second. What distinguishes the x from y? X stands

2 for what, and y stands for what?

3 THE WITNESS: Okay. X stands for

4 thresholds. I'll put these in parentheses, minimums,

5 because that's how this "threshold" is calculated. So

6 X stands for threshold. It's measured by the minimums

7 of the rows. And y, the y's are the shares that would

8 have been -- that either were or would have been

9 reported to the interviewer in the Bortz survey.

10 So in Exhibit 40, we -- one column for PBS

11 shows the y's that were actually reported for 22

12 operators.

13 CHAIRPERSON JIGANTI: You say that it

14 "would have been." Meaning that were reported, were

15 actually reported?

16 THE WITNESS: For 22 they were actually

17 reported.

18 ARBITRATOR WERTHEIM: That's which

19 exhibit, please?

20 THE WITNESS: Exhibit 40, the column

21 labeled "PBS." So x's are thresholds measured by

22 minimums. Y's are average shares measured by a survey

23 question. Survey instrument they like to say. We

24 know all the x's. We know 27 of the y's. We don't

25 know 146 of the y's.

1   Does that answer your question?

2   CHAIRPERSON JIGANTI: Yes, thank you.

3   THE WITNESS: I have to say I'm delighted

4 that you all are interested in getting into all of the

5 detail. I frankly didn't expect it, but I'm

6 delighted.

7   CHAIRPERSON JIGANTI: If you're delighted

8 now, you should have seen us at lunch.

9   (Laughter.)

10   THE WITNESS: I probably wouldn't want to.

11   CHAIRPERSON JIGANTI: No. You would have

12 enjoyed it.

13   THE WITNESS: I would have enjoyed it?

14   ARBITRATOR WERTHEIM: Well, we could have

15 just said you're the expert, we take your numbers.

16 But I'm not sure that all the other parties would

17 have.

18   THE WITNESS: Yes. I'm sure they

19 wouldn't. Okay. Going back to Chart 7, then, start

20 out with the data, Appendix 73, and the NM data. We

21 can start the probability model. The first part is

22 the geometric model for the x's, which has a mean of

23 10.8, simply the average of the 173 x's.

24   Now, the next step is a geometric model

25 for the y's. And there we can't simply find the

1 average of 173 y's and say, "Well, that's going to be

2 the mean of geometric for the y's" because, of course,

3 we're missing 146 values for the y's.

4   CHAIRPERSON JIGANTI: I'm sorry. The

5 average for the x's was?

6   THE WITNESS: 10.8. We're using 1990

7 throughout here as an illustrative year. So there's

8 going to be a geometric model for the y's. Our

9 problem is we can't write down a number for the name.

10 So we can't find the particular geometric model that

11 applies to the y's.

12   We know it has the form, mathematically

13 has the form. It's a geometric model. That's means

14 there's an expression that I'll show you soon, which

15 can be written in terms of the mean of the y's. But

16 that's unknown.

17   So the mean of 173 y's is unknown.

18   ARBITRATOR WERTHEIM: That's because at

19 this stage you haven't yet done your Chart 5 that

20 shows how you arrived at 4.4?

21   THE WITNESS: I'll get to that. It's

22 because, yeah, we haven't gotten to the point where

23 we've derived the answer. We can't just say, well, we

24 don't have all of the y's, but, hey, we've got 27 and

25 so on. We just average those and say, you know,

1   that's the average for y.

2   Well, that would be patently wrong, biased

3   upwards, because obviously the 27 who carry PBS had to

4   be the ones that on average accord the highest value

5   to it.

6   ARBITRATOR WERTHEIM: You say it would be

7   biased upward?

8   THE WITNESS: Biased upwards strongly.

9   ARBITRATOR WERTHEIM: Well, if you don't

10 mind my stopping you right there -- I intended to ask

11 this question later, but since you've now raised the

12 point, your Exhibit 40, the first page, that's the

13 values reported by the 22, is it not?

14   THE WITNESS: Yes.

15   ARBITRATOR WERTHEIM: I've taken a quick

16 look at that, and I've found that if you just confine

17 yourself to the 22 reported there, the average

18 threshold is 7.6, which is lower than your figure

19 there, not upwards.

20   And I start out by noticing that 15 out of

21 the 22 have their lowest non-zero figure at 5 or less.

22 Then we've got another 5 for whom the figure is 10.

23 And there are only two with higher figures.

24   So, if my math is correct, the average for

25 those 22 is 7.6. How is that consistent with your

1   saying that limiting yourself to this group would

2   result in a bias upwards?

3   THE WITNESS: Okay. I was talking about

4   the y's, and you're talking about the x's.

5   ARBITRATOR WERTHEIM: Oh, you're right.

6   You're right. Right. Excuse me. Let's pass that.

7   At some point later you can come back to it. My

8   question was: How do you get to a 10.8 if that was

9   the group?

10   THE WITNESS: I can answer that.

11   ARBITRATOR WERTHEIM: I don't want to

12   divert you from responding right now.

13   THE WITNESS: Well, just parenthetically,

14   I think it's -- I said this yesterday, but I have to

15   repeat these things several times. I had to try to

16   look at it from different angles, expose it at -- the

17   27 is not a random sample, 173, and cannot be regarded

18   as such. It is those 27 systems that carry PBS.

19   That's a selected group. I said yesterday

20   that the average threshold for them was about seven.

21   I think that probably includes the zero, but 7, 7.6.

22   It's in that neighborhood.

23   And, whereas, the average threshold, the

24   average threshold for the other 146, that's around 12.

25   It varies a little bit by year, but -- so for PBS

1   you'd have -- excuse me. And 10.8 is combination.

2   It's a weighted average of 7.6 and the 12.

3   ARBITRATOR WERTHEIM: And that differs and

4   is explained, you say, by the fact that the people who

5   selected PBS to buy had a lower threshold than the

6   people who did not?

7   THE WITNESS: On average, yeah. They

8   would tend to have a lower because those operators who

9   have the lower threshold can more easily get over the

10   hurdle of the threshold.

11   Given that PBS generally doesn't compete

12   with movies and sports, in particular, or at very high

13   share rankings, given that you know it's down in the

14   lower, much lower, neighborhood, it's easy for an

15   operator's threshold to knock it out of the picture.

16   So 10 or 20 threshold would knock it out.

17   But if you take those operators who have

18   the smallest thresholds, it's easier for them to take

19   on PBS because their threshold is smaller. So PBS is

20   eight, and their threshold is six. They'll take PBS.

21   That's one of the reasons why the 27 is

22   not a random sample. It's a self-selected group,

23   people who chose PBS. And one of the reasons, of

24   course, not the only reason, but one of the reasons,

25   they chose PBS is that on average their threshold is

1   lower.

2   Now, you have a whole range. You have --

3   some of them in PBS will have high thresholds. And,

4   as you notice, some of the values for PBS, one was 60.

5   One was 50, 40, 35, 25. Some PBS values were very

6   high.

7   So these operators could have a very high

8   threshold and still have chosen PBS. So 7.6 is an

9   average of a few high values and many low values.

10   ARBITRATOR WERTHEIM: So your 10.8 is

11   investment for your whole universe of 173?

12   THE WITNESS: Yes.

13   ARBITRATOR WERTHEIM: Thank you.

14   THE WITNESS: Okay. So we were on the

15   second stage of the probability model and geometric

16   model for the y's. And now we're saying that it would

17   not be appropriate to take the average of the y's we

18   do have and say, "Well, that's just the average for

19   everybody."

20   This is commonly done in situations where

21   you have reason to think the group you have, this

22   input you have, is like the rest of the universe that

23   you don't have or the rest of the sample that you

24   don't have. But that's clearly not the case here. We

25   can't just substitute 15.4 and say that's the average

1   for everybody.

2   So with both -- we do have that

3   information. We don't want to throw it away. We have

4   information that's 15.4 for 27. And then we have the

5   question mark for the 146. And that's our objective,

6   is to get rid of that question mark.

7   So what we do with this geometric model,

8   we can't break down a number for the mean. Instead,

9   we write down an algebraic term, like an x value. But

10   I'm not going to use x because that's confusing.

11   We've already used x for threshold. So

12   I'm going to call it a p. That's the unknown term

13   that appears in the mathematical expression that

14   you'll see sent. So p appears -- actually, in those

15   equations you'll see p. Actually, it's p with a $_y$ to

16   indicate it's p associated with the y's.

17   And then also as just a fact, the

18   reciprocal of p is equal to the mean of the y's. So

19   you take one over p, divide p into one, and that is

20   identically equal to the mean of the y's.

21   So, instead of having p in the equation

22   that you'll see, you could just substitute one over

23   the mean of the y's. I'll use this notation: y bar.

24   A bar in statistics means that it's an average.

25   And sometimes it might be helpful to put

1 a little 173 here because the unknown -- while this

2 would be the mean of the 173, this notation may be

3 useful later if we had the mean just on the 27. I

4 mean, we know what that is. Right? That's 15.4.

5 It's the mean of the 27.

6   We don't know what this is as to the mean

7 of the 173, although we have some information on it.

8 And we don't know what this is, which is the mean of

9 146. We have no information on this directly.

10   So we can rewrite the equation. It's most

11 convenient to use this unknown p, but it's equivalent

12 mathematically to substitute for p one over y bar at

13 173. So we treat this as the unknown algebraic value.

14   And then we would maximize -- the likely

15 function is the function of expressions involving p

16 or, alternatively, this overall mean. And then we

17 maximize that expression in order to find a value for

18 this. And that's where we actually get the number

19 6.9.

20   So the maximizing of this likelihood, the

21 probability of observing the data that we do is how we

22 solve our problem, by getting an answer to an unknown.

23 And now --

24   CHAIRPERSON JIGANTI: Could you do that in

25 actual numbers to get your 6.1?

1   THE WITNESS: Pretty much. If you would

2   permit me just to do the next step?

3   CHAIRPERSON JIGANTI: Sure, sure.

4   THE WITNESS: And then I'll go right to

5   that.

6   CHAIRPERSON JIGANTI: Okay.

7   THE WITNESS: At this point now I'm going

8   to write here -- no. Here we have the branching

9   point. If we write the probability in terms of this

10 algebraic unknown --

11   MR. HESTER: When you say "this," Dr.

12 Fairley --

13   THE WITNESS: Oh, the algebraic unknown,

14 y bar, subscript 173. I'm going to put here "Use y

15 bar, $_{173}$." And over here I'm going to put "Use y bar,

16 146" because that's the other choice of an unknown.

17   These are the two ways you can deal with

18 the unknowns. This says, "Use y bar, 146." It's not

19 very clear there. This branch says do this, use this.

20 This branch says use this. Mathematically it doesn't

21 make any difference. You're going to get the same

22 answer. That's the important thing.

23   So that's the problem with this one. If

24 you use this, then what do you do?

25   MR. HESTER: When you say "this," Dr.

1 Fairley --

2 THE WITNESS: Oh, excuse me. The use of

3 y bar, 173. Then you maximize; find the maximum of,

4 in other words, the so-called likelihood equation,

5 which I'm going to show you, maximize it for y bar,

6 173, which means you find that value of the unknown,

7 which makes the likelihood equation have the highest

8 value. And that's what occurred. And Exhibit 39

9 illustrates that process for y bar, 173.

10 Now, alternatively, if we had stuck in the

11 unknown into the equation as y bar, 146, it would

12 still do the same thing. It would maximize the

13 likelihood equation for y bar, 146.

14 Okay. Let's go over to the branch, which

15 happens to be the branch I actually followed. We'll

16 use y bar, 173. We'll maximize the likelihood we saw

17 for 173. The answer you know is 6.1. That's the

18 solution. Now I'm going to put here equals 6.1

19 because that's the answer.

20 Okay. Now we can solve for y bar 146

21 having 6.1. So the weighted average equation for y

22 bar at 146, the answer will be 4.4. That's what I

23 actually did. That was the actual sequence of events

24 in the work.

25 Now, here's an alternative sequence, could

1 have followed, use y bar, 146, maximize the likelihood

2 equation using that unknown. And then we can use --

3 we can solve for y bar, 173. And what do you think

4 that value is going to be? So, in other words, it

5 doesn't make any difference which route you take. You

6 end up, the same answers.

7 Are there questions about this before I go

8 to the -- go through the likelihood function? It's

9 really -- sorry the terminology isn't better. The

10 likelihood function.

11 ARBITRATOR WERTHEIM: And that function

12 for y bar, 146 would have come out to 4.4?

13 THE WITNESS: Down here on the right?

14 ARBITRATOR WERTHEIM: On the left, on the

15 left.

16 THE WITNESS: Oh, yes, yes. Enter that in

17 to complete the picture. That then answer would have

18 been 4.4.

19 CHAIRPERSON JIGANTI: Can you work out

20 that equation, --

21 THE WITNESS: Yes.

22 CHAIRPERSON JIGANTI: -- the first one?

23 Is that what you were going to do next?

24 THE WITNESS: Yes.

25 CHAIRPERSON JIGANTI: Okay. Very good.

1   THE WITNESS: See, you have a handout.

2   MR. HESTER: Your Honor, this is a

3   document that was produced in discovery.   And I

4   thought we should make it as an exhibit, PTV Exhibit

5   44, which is the formula itself.   We'll probably

6   understand why we thought it would be easier to copy

7   it and try to have a document fairly rendered on the

8   chart.

9   (Whereupon, the aforementioned

10   document   was   marked   for

11   identification as PTV Exhibit

12   Number 44.)

13   ARBITRATOR WERTHEIM: This is the formula

14   you referred to as maximizing the likelihood function?

15   THE WITNESS: It is, yes. It's actually

16   the likelihood function that you do maximize. But we

17   have function. You'll see the function right here.

18   So if you turn to the second page, which has these --

19   ARBITRATOR WERTHEIM: You asked for it.

20   (Laughter.)

21   THE WITNESS: Okay. Let's go to Exhibit

22   40, look at the first operator. Now, let me just try

23   to step through what's involved here in words before

24   getting lost in the symbols. What's being done at the

25   top of the page in Equation 1 is to write down an

1 expression or function, if you like, for the

2 probability of seeing one reported share.

3 Little a is one reported share. So let's

4 say a is 20 because that's the first. For the first

5 operator their response was PBS equals 20. Okay.

6 Now, what we have there on the right-hand, all the way

7 to the right of Equation 1, is the mathematical

8 function involving the geometric distribution for x

9 and for y that gives the probability that you'd

10 observe a y equal to 20 if the mean of the x's is 10.8

11 and the mean of the y's is whatever it is. That's the

12 unknown at this point.

13 Now, p -- let me just explain. This

14 equation has unknowns in terms of a p. It's just a

15 fact that p; for example, p with a $_x$ all the way over

16 to the right, that is just equal to one divided by the

17 mean of the x's.

18 So numerically that is one divided by 10.8

19 or about one-eleventh. So that number is about

20 one-eleventh you plug in there. So the first step in

21 our work was to find that number and plug it in. So

22 in terms of making this calculation, that's no longer

23 an unknown. That's an actual number. We can get rid

24 of it as an unknown in this equation in this function.

25 So already we're making progress.

1   Now let's make some more progress. Let's

2   get rid of a. Well, a is 20, as I mentioned. A is

3   the observed value. So plug in. Everywhere you see

4   a, put 20. That's because we're finding the

5   probability of observing 20 given the model we assume.

6   ARBITRATOR WERTHEIM: What's the symbol

7   right after the a in the top line? Is that l or a 1

8   or something else?

9   CHAIRPERSON JIGANTI: It looks like a

10 slash.

11   THE WITNESS: The top line. Oh, I see.

12 Yes. It's just a dividing symbol. It means given.

13 What's the probability of y equals a given that z,

14 which is the number of responses that were -- oh, it's

15 the number queried. Little z is 27.

16   ARBITRATOR WERTHEIM: I always talk, of

17 course, in symbolic logic. I think that dividing line

18 is where it was to be.

19   THE WITNESS: In this expression, if I

20 recall my symbolic logic, that dividing line had a

21 real function. I mean, it was -- it played a

22 significant role here. It's just like a punctuation.

23 It's just to help you read the formula.

24   So no, we've gotten rid of p_x and p and a.

25 We're left with p_y.

1   ARBITRATOR WERTHEIM: Excuse me. What did

2 you say z is?

3   THE WITNESS: Z is --

4   ARBITRATOR WERTHEIM: Number of what?

5   CHAIRPERSON JIGANTI: Twenty-seven.

6   THE WITNESS: Twenty-seven. Little z is

7 27. Capital Z refers abstractly to the number of

8 points above the 45-degree line, the number of

9 operators who responded and who must be conceived as

10 falling above the 45-degree line.

11   Okay. Now, p_y, which -- and you can

12 convert that into one divided by y bar, $_{173}$. If you do

13 that, if you just plug in that expression, in place of

14 p_y, then you've converted this expression from an

15 expression in the unknown p_y to an expression where

16 the unknown is denominated in terms of the unknown

17 average share for all 173, the y bar, 173.

18   That's purely a matter of taste and

19 convenience in the mathematics for the calculations.

20 It's a matter, whether you think of it as p_y or one

21 over y bar, 173, same answer. It means the same

22 thing. But whichever one you use, you don't know what

23 it is. It's an unknown.

24   As we went through before, we know

25 something about it. We have 27 values that are

1 involved in it. but we're trying to find out about

2 the 146 values that we don't have. So at this point,

3 this is right at the point where you see why I said

4 that this is the branch I took. I used 173. In other

5 words, you can imagine that I substituted for p_y one

6 over y bar, 173. And so I took this branch.

7   However, right at this point you could go

8 to this branch because you can also substitute for p_y

9 a little expression that involves this other choice of

10 the unknown, y bar, 146. I can put that expression up

11 on the chart if you'd like to see it. If anybody

12 would like to see that, I'd be happy to do that. It

13 just involves the relationship between p_y and this

14 unknown, as opposed to p_y and this unknown.

15   So this is the point where we branch. And

16 if we do substitute for p_y an expression involving the

17 y bar, 146, then we'll still do the same thing. It's

18 just that when you look at Exhibit 39, instead of

19 having along the horizontal axis there y bar, 173,

20 which is what's pictured there -- that's the average

21 for all respondents or that's -- that's the y bar,

22 173. That's the unknown that we're dealing with, that

23 I dealt with.

24   We could have as the unknown y bar, 146.

25 But, instead of going from 5 to 6.5 in the picture, we

1 would -- you'd see -- where 5.7 is, you'd see 4.4;

2 actually 4.3, because in 1992 y bar, 146 was 4.3;

3 whereas, y bar, 173 was 5.7.

4 So we'd have here in the center of the

5 x-axis 4.3. And then we might go down, you know, to

6 -- this goes up 5.7. So we might go down to, let's

7 say, three and a half. And we might go up to six on

8 the axis. And you'd see the same curve, but just

9 centered over the value of this other unknown.

10 So, of course, you have to keep track

11 which unknown you're finding. You have to know what

12 it means. And here keeping track of y bar, 173. And

13 now I know I get the answer here for that. I know I

14 can always go and get the 4.4, back it out. And,

15 similarly, here if I did solve the 4.4, -- of course,

16 now we're back to 1990 -- I could solve the 6.1.

17 So still going back, then, to the top of

18 the page with the formula for the probability of

19 observing y equals 20, that's the first operator.

20 That gives that probability as a function of -- that

21 is, depending upon the unknown we're looking for.

22 And that's all it depends on, that we now

23 -- the right-hand expression there at the top in

24 Equation 1 is now just an expression, depends on only

25 one unknown, which as written is p. And we can

1   transform it into either of these two equivalent ways

2   of expressing it; that is, the two are y bar, 173 and

3   y bar 146.

4   ARBITRATOR WERTHEIM: What's the meaning

5   of the expression shown by the asterisks and by the Σ?

6   THE WITNESS: The asterisk just means

7   multiplication.   And the Σ means summation.   So

8   there's a sum here in the denominator. It starts out

9   on I as zero. So you plug in I equals zero into that

10   expression to the right of the Greek letter. And you

11   evaluate that. And then you plug in I equals one.

12   And you evaluate that and add it to your first answer.

13   then you go to I equals two and so on. You just keep

14   adding.

15   And it says it goes from zero to infinity.

16   Of course, nobody can actually go up to infinity. No

17   one has. It hasn't been reported yet anyway. And

18   what happens is that the values trail off until

19   they're negligible and you just stop. That's what

20   that means.

21   And, of course, these calculations are

22   programmed in a computer. It would be very tedious

23   otherwise. And the computer programs, I doubt that

24   these are at all illuminating to you, but programs are

25   attached at the end.

1   Okay. Now, let's just step back a second

2 and say: Well, what does this mean? Why are we

3 looking at this equation anyway? Well, it's the

4 probability that a share value will be a 20. What's

5 the probability that under this model that we've

6 created the share value will be a 20.

7   Well, think about it. It's actually --

8 the highest probability for saying it's 20 is if the

9 mean of y's were exactly 20. I mean, if the mean of

10 the y's were 20, it would be expected to see a 20 in

11 that. You're right on the button there. You're right

12 on the mean.

13   But let's take another shot. Let's say

14 suppose the mean of the y's were two, two percent.

15 And now what's the chance of someone getting 20

16 percent? Well, naturally that depends on what the

17 mean of the y's is. No. Excuse me. Scratch it. the

18 mean of the y's is two percent.

19   What's the chance of seeing 20? It

20 depends on the mean of the y's, which is two percent.

21 That's going to be a pretty small number because if

22 your mean of the y's is two, the chance that you're

23 going to -- someone's going to go all the way up to 20

24 I can tell you under this model is not very great.

25   Correspondingly, let's go above 20. You

1   know, let's go up to 40. What's the chance -- or 60.

2   What's the chance if the mean is 20 that someone would

3   give a 60? Not very great, although not negligible

4   because this geometric distribution is very spread

5   out.

6   You can recall from the examples I've

7   given it's spread from -- really from zero up to

8   beyond 60 it begins to get negligible, but there's

9   some interesting probability you need to account for

10   all the way from zero to at least 60. So I'd say the

11   chance of seeing 20 if -- of seeing 60 if the mean is

12   20 is not great. I don't mean it's uninteresting or

13   that it's negligible. It's just a lot lower than the

14   chance of seeing 20 if your mean is 20.

15   So that the notion here, it embodies the

16   essence of the likelihood maximum information. Right

17   here if all you had was one observation, then the

18   maximum of this expression on the right of Equation 1

19   will be at 20. And that will say if all you have is

20   one observation and no other information, the answer

21   would be 20. That's what you would guess. I mean, it

22   could hardly be more than a guess at that point. You

23   have a sample of one.

24   Okay. Now we're going to take that idea

25   and run with it because now we have more than one

1   observation. We have 27 observations. And I'm going

2   to jump all the way down to Equation 4.

3   See the four in the left-hand margin. And

4   on the left you see l. That stands for likelihood.

5   And inside the brackets you see the y is going from y1

6   to y2. So y1 would be this operator one. Y2 would be

7   the second operator. And yz. Z is 27. So z is the

8   27th operator. And the dots just mean, well, imagine

9   there are 27 there. And then the z is -- the z value

10   is equal to 27.

11   Okay. Now, that equals -- so all that is

12   saying is that this is what we're talking about.

13   We're talking about the likelihood function. That's

14   what I've been talking of. Now, that equals something

15   on the right-hand side of that Equation 4.

16   And you see that other Greek symbol.

17   Capital π, isn't it? It means product. Just as the

18   sigma, the Greek sigma or sun for S, meant sum, P

19   means product. And it's a product of 27 terms

20   corresponding to the 27 actual y observations that we

21   have. Now, the first term in that product is just

22   Equation 1.

23   So the first term is the probability that

24   y equals 20. We've just been through that. The

25   second term is the probability that y equals 10 for

1   Operator 2. Operator 2 gave a 10.

2   The third term is the probability that y

3   equals 5 and so forth in Exhibit 40, following down

4   all those non-zero PBS values. The last five terms

5   are the probability that y equals zero because those

6   were also given. They're included here.

7   And then the next term is you have the

8   probability of the p (Z equals z.). That's an

9   expression for the probability that under the model

10   with the probabilities that are assumed in the model,

11   what's the chance that you'll see 27? Let me just

12   pause on that point because I think I can illustrate

13   also the logic of the estimation seen down here.

14   Suppose the mean of the y were way up here

15   at 40. And PBS would love that.

16   MR. HESTER: Dr. Fairley, you're on Chart

17   1?

18   THE WITNESS: Chart 1. Suppose PBS had,

19   in fact, an average share of 40, contrary to fact.

20   How many of these points would you expect to see above

21   the threshold? A lot more than 27 because such a big

22   average value, most operators, a great majority of

23   operators, are going to be over their threshold.

24   Now let's take the other extreme. Let's

25   go down to one percent for PBS. Suppose PBS' share

1   were one percent. How many operators would you expect

2   to be above that threshold? Not very many because

3   there's the value -- the average value is so low that

4   maybe only a handful of operators would get above

5   their threshold.

6   So if the mean of y is this low, it

7   doesn't make sense, does it? It doesn't correspond to

8   what we observe. It wouldn't predict what we observe.

9   If the mean of y is up here, it doesn't make sense.

10   It doesn't predict what we observe.

11   Now, this is a continuum. As you travel

12   down here in this direction --

13   MR. HESTER: In which direction are you

14   going?

15   THE WITNESS: Down from, let's say, a mean

16   of 40 down towards 30, towards 20, and so forth. Does

17   our model become more plausible? Does it correspond

18   better to what we observe? Yes, it will because

19   you'll get predictions that are more in line with

20   observations.

21   Now, at some point it gets better and

22   better and better, but you know that way down here

23   it's not good at all. So at some point you reach a

24   maximum where it's the best it's going to get. And

25   from that point on it's all downhill. And it becomes

1   less and less likely as you go down here.

2   And, in fact, all our answer says is that

3   6.1 is that point. That's the top of the hill.

4   That's the value that makes most likely all the

5   observations we did observe. And I just wanted to use

6   this point in the algebra to step back and illustrate

7   the common sense logic of this. We're trying to get

8   a number that makes the data we observe reasonable to

9   have observed and more reasonable than any other mean

10   for y. So we have chosen the one that in that sense

11   is the most reasonable value.

12   Now, this expression for p with C equals

13   z, p(Z) equals z, it comes in the first instance from

14   Equation 3. You see an expression there for that same

15   quantity, that same expression.

16   And then, in turn, in order to evaluate

17   numerically Equation 3, you have to go up to Equation

18   2 because you can see p (Y greater than or equal to X)

19   in Equation 2 on the left-hand side. That's exactly

20   one of the terms in Equation 3. You see that

21   expression there within Equation 3.

22   So to evaluate; that is, define

23   numerically the answer or algebraically the answer to

24   Equation 3, you substitute from Equation 2 into

25   Equation 3.

1   And Equation 2 we can understand in just

2   the same way we understood Equation 1.   On the

3   right-hand side of Equation 2 we have a summation of

4   a large number of terms that involves p_x.   We know

5   what that is.   That's about one-eleventh.   It's one

6   divided by 10.8.

7   And p_y is the unknown.   It's the same

8   unknown as in Equation 1. So it appears again in this

9   part of the -- in this term. And then -- now we -- by

10 making that substitution at two places, substitution

11 of Equation 2 in two places and Equation 3, we have

12 now evaluated Equation 3.

13   We know what z is.   It's 27.   And n in

14 Equation 3 is 173. So between Equation 2 and Equation

15 3 we have reduced Equation 3 to an expression

16 involving numbers and the unknown term p_y.

17   So just as Equation 1 was reduced to an

18 expression involving only actual numbers and one

19 unknown, we've done that for 3. And if we take our

20 expressions for 1 and 3 -- well, for 2 we plug into 3.

21 Now we have 3 and 1. And we plug those into 4. Now

22 we have 4 in terms of simply an arithmetic or

23 algebraic expression involving numbers and one

24 unknown, p_y.

25   So all Equation 4 is is equal to an

1   expression or a function depending upon p_y. And, once

2   again, we can equivalently write that as an expression

3   depending upon the mean of all the -- mean share of

4   all 173 -- that's y bar, 173 or, equivalently, as an

5   expression involving the unknown mean of the 146, y

6   bar, 146.

7   But let's step back again, just as we did

8   in Equation 1, and say: What does Equation 4 mean in

9   words? Whereas in Equation 1 we talked about the

10   probability that you observed one value that you

11   observed and that could be any one of the values you

12   pick out, in Equation 4 we're talking about the

13   probability that you would jointly observe all 27

14   values that you did observe.

15   So this is what's called the joint

16   probability, strictly speaking. Technically it's

17   proportional to the joint probability of observing the

18   27 y values that you already observed.

19   Now, that shows you directly and

20   concretely that the solution for 6.1 comes out of a

21   consideration of those 27 y values because you plug

22   those right in here. Those are the a's up in Equation

23   1.

24   Now you say: Well, does it depend on the

25   x values? Yes, it does. It also depends on the x

1 values through up at Equation 1 and in Equation 2 p,

2 p_x, which I can tell you is equal to .1639. And that

3 -- excuse me. No. That's the other. That's p_y. P_x

4 is one over 10.8. That's the one-eleventh. That's

5 what we were -- I was talking about before. So

6 whatever that is.

7 Just 10.8, the reciprocal of that is

8 .09259. That's just a number, .09259. But the point

9 is it's one over the mean of the x's. And that's

10 where the values of all the x's are brought to bear.

11 So they're all used in this likelihood.

12 And if the x's were different, the answers would be

13 different. If the y's were different, the answers

14 would be different. So the likelihood depends upon

15 the y's and the x's.

16 So it depends upon a lot of data that's

17 been observed through the survey. All this

18 information is from the survey. And it depends upon

19 the responses given by the -- those queried and those

20 not queried.

21 And so if you go to Equation -- excuse me

22 -- Exhibit 39, if we were dealing with 1992 again,

23 what this curve represents is it's a plot of the

24 expression on the right-hand side of Equation 4 where,

25 instead of the unknown, y bar, 173 or, equivalently,

1 p_y, we have substituted particular values of y bar,

2 173 because once you have a value for y bar, 173, we

3 can get a number out of Equation 4. That's the only

4 thing that wasn't a number in these expressions, was

5 this algebraic unknown, p_y or, as I say, you can

6 equivalently deal with it in terms of y bar, 173 or y

7 bar, 146.

8 So in the graph here we're dealing with it

9 as a function of y bar, 173 in Exhibit 139. And let's

10 say we substitute 5.0 for y bar, 173. Now we evaluate

11 this expression numerically. And we go. We travel

12 up, and we plot that number. That's the number that's

13 plotted here.

14 And it looks like about 1.4. I may have

15 said .4 earlier. I did, I think. Yeah. That's 1.4

16 that -- if we go to -- if we substitute an expression

17 for y bar, 173, we substitute 5.5. Then we travel up

18 to the value of the curve at 5.5. And if you look at

19 a vertical line above 5.5 at that intersects the

20 curve, it looks like it's about maybe five and a half

21 on the vertical axis. So at 5.5 you get 5 and a half.

22 Now, at 5.7 you travel up, and you hit the

23 top of this curve. And that looks like it's about

24 maybe 5.8. And that is the maximum value of this

25 function. And it's associated with a mean for all the

1 observations in the survey of a mean of 5.7 for all

2 the shares.

3 And if you -- so this process of traveling

4 from 5 to 5.5 into 5.7, that's exactly the process I

5 was going through here of traveling, instead of from

6 one, which I chose for -- as an extreme illustration,

7 we go here to 5, to 5, and we compute the likelihood

8 and plot it here, and we go to 5.5 and we compute it

9 and get 5 and a half, that's bigger. So we keep

10 going.

11 But I'm sorry. This illustration -- we're

12 now back to 1990. So the peak here for 1990 would be

13 centered over 6.1. So we would stop there. That

14 would be the maximum likelihood estimate for 1990.

15 And then as you travel above 6.1 in a

16 graph for 1990, you'd be going down the other end of

17 the other side of the curve but have smaller

18 probabilities.

19 So the common sense notion of maximum life

20 is: Which would you rather select as your estimate

21 for the mean of the y's, a value that made most likely

22 what you observed or a value that made it unlikely to

23 see what you observed or less likely? I think the

24 question answers itself. You want the value that

25 makes it more likely that you would have seen what you

1   observed.

2   CHAIRPERSON JIGANTI: Thank you. That's

3   a complete answer to the question; right?

4   MR. GARRETT: Could we have that answer?

5   (Laughter.)

6   CHAIRPERSON JIGANTI: He probably could do

7   it from memory.

8   ARBITRATOR WERTHEIM: Mr. Hester, would

9   you be able to make reduced copies of these charts

10   available easily?

11   MR. HESTER: Yes. I thought I would

12   intend to -- I think first I may try just to photocopy

13   them, get them reduced as photocopies. That might be

14   easiest of all. If not, we may have to do one of my

15   artistic renderings. But we will --

16   ARBITRATOR WERTHEIM: It might be better

17   to have them photocopied because we're probably the

18   only ones who remember what it means, those direct and

19   crossed entries and those secret codes on top of each

20   other, but at least it would be complete.

21   MR. HESTER: Right. I thought at the end

22   of the testimony we could mark them as exhibit numbers

23   and then I'd go off and get them copied, if that makes

24   sense.

25   CHAIRPERSON JIGANTI: Okay. Mr. Lane,

1   we're back to you.

2   ARBITRATOR WERTHEIM: We've eliminated

3   half your remaining --

4   (Laughter.)

5   ARBITRATOR WERTHEIM: While we're waiting,

6   I have one question.   On Exhibit 44, the very first

7   paragraph, in the background, there's a reference to

8   redraft of report and communicate research.   What is

9   that?

10   THE WITNESS: I'm not sure I have Exhibit

11   44.

12   ARBITRATOR WERTHEIM: This is one with all

13   the --

14   THE WITNESS: Oh, this is what we were

15   just talking about.   Okay.

16   ARBITRATOR WERTHEIM: The first page.

17   MR. LANE: The first page.

18   THE WITNESS: The first page.   And which

19   line?

20   MR. LANE: Second.

21   THE WITNESS: Second line?

22   MR. LANE: Fourth line.

23   ARBITRATOR   WERTHEIM: It's the first

24   paragraph, fourth line.

25   THE WITNESS: Fourth line.

1   ARBITRATOR WERTHEIM: The   third   and

2   fourth.

3   THE WITNESS: Let's see.

4   ARBITRATOR WERTHEIM: It's apparently a

5   reference to some document.

6   THE WITNESS: Yes. Well, I don't recall

7   exactly what document it is, but it's a document that

8   gives some interpretation about why you see zeros,

9   which we mentioned yesterday since --

10   ARBITRATOR WERTHEIM: Do you know who the

11   author of that document is?

12   THE WITNESS: Sorry?

13   ARBITRATOR WERTHEIM: Do you know who the

14   author of that document is?

15   THE WITNESS: It says "redraft of report."

16   I'm a little puzzled. I mean, that would be me. Oh,

17   okay. This is -- it would be, you know, like another

18   draft, a second draft perhaps, of a report that I was

19   writing up. And that probably had a paragraph dealing

20   with this question about the zero responses.

21   ARBITRATOR WERTHEIM: So that's a draft of

22   a work in progress that hasn't yet been published?

23   THE   WITNESS: It's   certainly   not

24   published. It's, in essence, my testimony.

25   ARBITRATOR WERTHEIM: Thank you.

BY MR. LANE:

Q   If you were asking the cable operators a question designed to get the 6.1 or, actually, the 4.4 answer, what would that question be?

A   Now, when you say "designed to get 6.1 or" --

Q   I'm sorry. If you asked 146 respondents a question and that question was designed to give the answer 4.4 that you got in your mathematical equation, what would that question be?

A   So you're mentioning an empirical verification?

Q   Yes. I'm imaging that you walk around to 146 cable operators and you ask them the question to see if you get a 4.4 result.

A   Okay. It would have to be -- either these 146, not just any 146?

Q   It would be these?

A   These are exactly the same people.

Q   And, of course, there's the --

A   Everything is exactly the same. Okay?

Q   Okay.

A   The only change is you're going to tell me what question you would ask them.

Q   Okay. You're not talking about actually

1   doing this because --

2   A   No, I'm not.

3   Q   -- now we have some history and they've

4   given --

5   A   I'm not talking about actual --

6   Q   This is hypothetical. It would be exactly

7   the question that was asked with one change in

8   wording. The question as asked, Question Q.4(a) in

9   the Bortz survey, made a reference to, an explicit

10   reference to, systems you actually carried, stations

11   you actually carried?

12   In the buildup to that in the actual

13   questionnaire, they -- you recall they started off by

14   listing the stations they actually carried. That part

15   could be the same. You could just list them.

16   So the only thing that's changed is all

17   the way over in Question 4(a). And you would take out

18   that specific phrase that said or implied that they

19   actually carried the station.

20   Q   So, in other words, you would say -- and

21   I don't know what the wording was, but if it was

22   thinking about those stations, meaning the ones I had

23   identified to you earlier, how would you value

24   different programs, you would just take that, thinking

25   about those stations, out?

1 A Well, that -- let me say I'm trying to

2 give you an idea of how it would be done, but when you

3 get down to actually doing this, in order to get

4 equivalent results, if you thought this wording was

5 just the be all and the end all and you wanted to get

6 results that were really equivalent to the wording

7 that has been used these last or for these three

8 years, where it's that the wording does change a

9 little bit as you go from year to year, but in this

10 respect, it was the same.

11   So if you said, "Okay. I definitely want

12 to stick to this wording to this concept in the

13 question, I don't want to depart very much" --

14 Q I don't want you to be limited to the

15 question. I want you to tell us exactly how you would

16 just write the question --

17 A Okay. Well --

18 Q -- without any limits on what was written.

19 A There would be two steps here if you

20 wanted to stick to the question that was written. If

21 you don't want to have to stick to that, then I'll

22 give a different answer.

23 Q Give both answers.

24 A Okay. The first answer is there are two

25 steps you could take. First you'd change the wording,

1 as I mentioned, so that there wasn't an implication

2 for the listener that they had to have carried the PTV

3 signal. And, of course, they -- even though they

4 hadn't carried it, they would be asked this question.

5 And we'd get the answers.

6 Now, here's what you could do. Instead of

7 asking just the 146, if you could, you'd ask all 173.

8 And right there you'd get a verification. If you got

9 the same average answer from the 27 who had earlier

10 responded, you would have some evidence, probably very

11 strong evidence, that the new question was

12 functionally equivalent to the old question. And so

13 you would have some confidence that the new question

14 is really equivalent for all practical purposes. And

15 you would take the answers on face value from 146 that

16 you now have and didn't have formally.

17 If, on the other hand, -- this is the

18 second answer -- let's say you did this and you found

19 there was a difference and you didn't get the same

20 pattern of answers and particularly you didn't get the

21 same average within some range of uncertainty, it

22 wouldn't have to be exactly the same mean, but within

23 some range you didn't get something equal to or close

24 to 15.4 for those 27, then there's a device called

25 calibration, where -- which we all use in many ways,

1 where you calibrate the answers to the second question

2 to the answers to the first.

3   So you'd plot the relationship of the

4 first answer to the second. The first answer is x,

5 second answer -- excuse me. The first answer is taken

6 to be y. The second answer is taken to be x. And you

7 plot a line of relationship. For example --

8   CHAIRPERSON JIGANTI: Excuse me. Are you

9 answering --

10   THE WITNESS: Yes.

11   CHAIRPERSON JIGANTI: -- Mr. Lane's

12 question?

13   THE WITNESS: I am.

14   MR. LANE: I don't think so, but he can

15 answer whatever he wants.

16   ARBITRATOR WERTHEIM: I think you've

17 answered it, but you're going beyond --

18   THE WITNESS: I'm going beyond. Okay.

19   ARBITRATOR WERTHEIM: -- what you did if

20 you didn't like the result.

21   THE WITNESS: It's not a matter of not

22 liking. Okay. You didn't like it, but you're not --

23   ARBITRATOR WERTHEIM: Not satisfied.

24   THE WITNESS: Well, the -- I guess I'm

25 anticipating an objection to my first answer, which is

that if you change the wording, maybe you're going to

change the responses. You know, if you have this

wording, you'll get one set of responses. But if you

had the prior wording, you would have gotten a

different set.

So we're not dealing with -- we have

apples and oranges here, where one question is getting

one answer and the other question is actually getting

a different answer.

CHAIRPERSON JIGANTI: Mr. Hester clarified

that. I think it would be better if you answered the

question Mr. Lane asked.

THE WITNESS: Okay. Okay.

BY MR. LANE:

Q   And my question was: How would you change

the wording to ask the question of either -- I don't

care if it's 173 and you get the 6.1 answer or the 146

to get the 4.4 answer. What would be the question you

would ask them or how would you ask the question?

A   I would go through a process of

determining what that question was. I couldn't sit

here today and tell you what the question is. I can

tell you the process I would go through to get to that

question.

ARBITRATOR WERTHEIM: And that's because

1 you don't have the question in front of you?

2 THE WITNESS: No. It's because as a first

3 cut I would ask -- I would do what I said before. I

4 would just change the one phrase in Question Q.4(a),

5 which asked about relative shares, to eliminate an

6 implication that you had to have taken PTV because we

7 don't want that.

8 That's what I would do. That's the first

9 cut at it. And that may be the end of it. That may

10 be functionally equivalent, practically equivalent to

11 the first question. And that will give you the

12 answers. But I'm not going to sit here today and say

13 that that's the answer because I know that question

14 wording and surveys can make a difference to the

15 responses you get.

16 And if you thought that might be the case

17 here, if you wanted to establish that it wasn't the

18 case here, then you would go through this lengthier

19 process that I was launching into of where you

20 calibrate the answers to one question to the answer to

21 the other and using that relationship, you can adjust

22 the answers to the revised question to get answers

23 that are predicted to be equivalent to the first

24 question.

25 So the point is you're not merciless,

1   you're not reduced to simply speculating about whether

2   your changing wording really changed the type of

3   responses you'd get. You can actually test this and

4   then adjust for it if it does -- if you have evidence

5   that there is a change.

6   BY MR. LANE:

7   Q   I'm not particularly interested in the

8   exact wording. What I'm more interested in is: What

9   question are you attempting to answer with all the

10   word that you did? Could you phrase that for us,

11   please?

12   A   I'm attempting to find relative economic

13   values attached by cable operators to different

14   program categories where values is not limited to

15   having observed a sale. It's the broader notion of

16   value that's recognized in economics that in a market

17   there that the supply and demand intersection, which

18   directly determines the price, if we were thinking

19   here of a hypothetical market that -- whose outcome

20   you're trying to understand or since we're not in the

21   national market, we have a statute that has compulsory

22   licenses or royalties, we have to imagine something

23   like that.

24   And the concept of economic value includes

25   the value for people who didn't actually purchase.

1 They also have values attached to different program

2 categories, whether or not they selected them.

3   So it's -- the objective is to find

4 economic value determined in a -- in that broad sense.

5   Q   Now, when you used the term "sale and

6 selection" in that answer, did you equate that with

7 carrying a distant signal?

8   A   Yes.

9   CHAIRPERSON JIGANTI: Mr. Lane, I think we

10 ought to take a recess at this time.

11   MR. LANE: Fine.

12   (Whereupon, the foregoing matter went off

13   the record at 2:27 p.m. and went back on

14   the record at 2:50 p.m.)

15   ARBITRATOR WERTHEIM: We found something

16 else to discuss over the break.

17   ARBITRATOR FARMAKIDES: Also very

18 relevant.

19   MR. LANE: I hope it wasn't whether you

20 can sit on Sunday.

21   (Laughter.)

22   ARBITRATOR FARMAKIDES: That's up to you,

23 Mr. Lane.

24   CHAIRPERSON JIGANTI: I've got the keys to

25 get into the car. I don't have to worry about taxis.

1   ARBITRATOR WERTHEIM: Dr. Fairley, I'd ask

2   at this time if you'd go through providing us with a

3   general   explanation   of   some   of   the   technical

4   expressions used in the last paragraph at the bottom

5   of Page 1 in Exhibit 44. Have you had an opportunity

6   to think about that?

7   THE WITNESS: Yes.

8   ARBITRATOR WERTHEIM: All right. I'd be

9   glad to hear your response.

10   THE WITNESS: Okay. The S Plus is the

11 name of a statistics computer program.   It's one

12 favored by statisticians, and we used it to perform

13 the calculations here. And an S Plus function is a

14 particular program written within that larger program.

15 S Plus is actually a programming language as well as

16 a set of already written programs.

17   Then was the next one Condbin that you

18 asked about?

19   ARBITRATOR WERTHEIM: Yes, I believe so.

20   THE WITNESS: Okay.   That is an S Plus

21 function that computes the probability given in the

22 line above that y equals a and so forth. And that's

23 the expression in Equation 1 on Page 2.

24   ARBITRATOR   WERTHEIM: That's   halfway

25 there. Thank you.

1   THE WITNESS: Probnbin in Line 3 is

2   similarly a program within S Plus that computes the

3   probability of Z equals z under the model.

4   ARBITRATOR WERTHEIM: And   the

5   straightforward conditional probability computation is

6   what?

7   THE WITNESS: Okay.   A conditional

8   probability computation says find the probability of

9   something given that something else is true or

10   happened.

11   Equation 1 on top of Page 2 is a

12   conditional probability. It's the probability that,

13   say, y equals 20 given -- that's what the vertical

14   line means, given -- that z is 27 and y is bigger than

15   its corresponding x value.

16   ARBITRATOR WERTHEIM: Thank you.

17   CHAIRPERSON JIGANTI: You may proceed, Mr.

18   Lane.

19   MR. LANE: Thank you.

20   BY MR. LANE:

21   Q   Mr. Fairley, before the break, I'd asked

22   you a question about what question you were trying to

23   answer with your calculations. Do you recall that?

24   A   Yes.

25   Q   And you indicated that the question would

1   have to be one that did not consider whether or not

2   they took PBS stations as a distant signal; correct?

3   A   Yes.

4   Q   And if that were the question, would you

5   limit that just to PBS alone or would you have to

6   consider the possibility that they could take other or

7   that have a value for other signals that they had

8   taken?

9   A   No, not -- you wouldn't. The problem with

10   the automatic zeros is for the other program

11   categories there are no automatic zeros. The other

12   program categories are always given an opportunity to

13   receive a positive value; whereas, for PBS there's --

14   they're not given that opportunity.

15   So you have what I consider to be the one

16   problem; that is, the survey, which is it's not

17   uniform in that particular respect.

18   ARBITRATOR WERTHEIM: Are you saying that

19   for the religious programming and devotional

20   programming the zeros all reflect actual responses,

21   giving a zero value to those programs?

22   THE WITNESS: Yes. And, for example,

23   there may well be --

24   ARBITRATOR WERTHEIM: I meant religious

25   and the Canadian.

1   THE WITNESS: Well, religious is different

2   from Canadian. Religious there are no automatic

3   zeros, but Canadian there are. Canadian and PBS are

4   the ones with the automatic zeros.

5   Now, for religious there may well be for

6   other categories, but let's just take religious.

7   There may well be a number of systems, maybe a large

8   number there that for the distant signals they carry

9   they don't have any religious programming.

10   So that the signals they're carrying just

11   -- maybe they're only carrying one or two signals and

12   the signals they decide to carry don't have religious

13   programming.

14   So they didn't carry it. And, yet,

15   there's an opportunity that that religion is not

16   zeroed out there, it's not given an automatic zero;

17   whereas, PBS is in the same circumstance. So one's

18   given an automatic zero the same circumstance that the

19   other is not. That's the problem.

20   ARBITRATOR WERTHEIM: All right. What

21   about the Canadians?

22   THE WITNESS: Same, same problem.

23   ARBITRATOR WERTHEIM: I thought you said

24   they're different. They are zeroed out?

25   THE WITNESS: Canadian is zeroed out, yes.

1   I didn't mean that they had the same problem that the

2   religious category presents.

3   ARBITRATOR WERTHEIM: Well, then to go

4   back to Mr. Lane's questions, what about the

5   probability that the Canadian programming had some

6   value that was not allowed for? Shouldn't some

7   adjustment be made for that according to you?

8   THE WITNESS: Yes, strictly speaking. I

9   looked at that. Part of the work on this was to fit

10   these same models to the Canadian data, and I did

11   that. I can't give you details on that at the moment

12   except to say -- first, let me just go back.

13   Canadians are a little different in that

14   it's technically physically impossible, as I

15   understand it, to receive Canadian signals some

16   distance from the border. You have to be close enough

17   to the U.S.-Canadian border to technically be able to

18   get the signals.

19   So there it's those stations some distance

20   from the border, which, in fact, constitute something

21   like 80 percent or more of all stations in the

22   country. They are really zeroed out. There's no

23   question. I mean, there can't be any value if you

24   can't possibly receive the station. So that's

25   perfectly appropriate.

1   But also zeroed out were operators who

2   could technically receive Canadian stations. They're

3   near the border but they didn't happen to carry

4   Canadian stations. But they're given an automatic

5   zero.

6   So for that group of operators, Canadian

7   system -- the Canadian program category is in exactly

8   the same disadvantageous position that the PBS

9   category is in in the survey. It's being treated

10   differently.

11   And, as I mentioned, I fitted exactly the

12   same models. And you do get some estimate of an

13   increase. It's not nearly the size we're talking

14   about here because Canadian stations, of course, are

15   restricted now to the small group near the border and

16   then further, as I recall, typically their shares are

17   lower than PBS.

18   So, for both of those reasons, the -- it

19   increases the Canadian share but not a great deal.

20   But, yes, the same methodology applies and principle

21   should be applied.

22   BY MR. LANE:

23   Q   Mr. Fairley, let me see what you said in

24   response to my question about -- and you used the

25   example of the devotional or the religious

1   programmers. As I understand it, what you're saying

2   is when the respondent gave an answer, a zero answer

3   for Devotionals, for example, that respondent had the

4   opportunity to think about stations that he or she

5   might have carried but didn't and what value it would

6   have placed on devotional programs in that situation.

7   A   I didn't talk about that just now.

8   Q   But when you answered my question, that's

9   what you talked about. All right. Let's back up,

10   then.

11   What's different about the zero value for

12   Public Television stations, the automatic zero, and

13   the zero values in the other situations in your mind?

14   A   The zero, the automatic zero, for PBS is

15   a substitution of a value for PBS and also in some

16   cases for Canadian which is not done in similar

17   circumstances for the other program categories.

18   Q   And what is the non-similar circumstance?

19   Both categories, both situations the people were told

20   what stations they had; correct?

21   A   Yes.

22   Q   The PTV didn't have a station. So what is

23   the difference between those two situations?

24   A   Between --

25   Q   In the respondent's mind, why is a zero

1   value in the devotional program, for example,

2   different from an automatic zero value in the PTV

3   situation?

4   A   Because they're two situations with a zero

5   for Devotionals. The zero for Devotionals in these

6   data, you don't know whether they -- whether it's --

7   whether they actually had any devotional programming

8   or not. They may not have had any devotional

9   programming, in which case they were, nevertheless,

10   asked about the value of Devotionals. They gave zero.

11   I view that, as I mentioned, as a rounding down from

12   something.

13   Now, there's another case where some --

14   let's say some of the threes or fives --

15   Q   Can I just interrupt you for a second

16   before you get to the threes or fives? You're saying

17   that there may be some cases where they didn't get any

18   devotional programming. And, yet, you're saying that

19   in that situation the zero would be a rounding down

20   from some value?

21   A   Could be.

22   Q   So where are they getting the value that

23   they're rounding down? What are they valuing there if

24   they don't get any devotional programs?

25   A   It's the same kind of value as the value

1   for the 146 there.   There's economic value there.

2   It's not worthless to the operator, but it doesn't --

3   it's not high enough to get over the threshold.

4   Q   Okay.   If that's the case, if we were

5   asking   the   respondents   the   question,   the   146

6   respondents the question, that you pose, would we have

7   to ask that question as to all categories; in other

8   words, just eliminate any reference to any stations

9   that were carried or not carried, regardless of what

10 type of station they were?

11   A   In the question?

12   Q   Yes.

13   A   No, I don't think you have to -- as I

14 mentioned before in an earlier answer, you'd have the

15 first questions in the survey.   Towards the first of

16 the telephone interview, they were given a list of

17 stations that they carried.   You could still give

18 them.

19   Q   But in the valuation question, would you

20 have to eliminate that?

21   A   Was it repeated?   I just don't remember.

22 What you would have to eliminate is any implication in

23 the wording that they had to consider in their answer

24 only those categories that they actually took -- they

25 actually had.

1   Q   And so that would apply to any category?

2 It wouldn't just be limited to Public Television

3 stations in that situation?

4   A   Yes, but Public Television or Canadian,

5 they're the only ones for which it's a problem because

6 for some of the other program categories there may be

7 positive values there. Devotional --

8   Q   How do you know that answer if what you're

9 measuring is economic values that are unrelated to the

10 stations that they carried?

11   A   I'd like to just finish --

12   Q   Okay.

13   A   -- what I'm saying. For religious it may

14 be that some of the share values given below five --

15 and there are some of them here. I think there are

16 more than for religious, as I recall, than for other

17 categories. And even some of the fives may well be

18 for operators that don't carry any religious

19 programming.

20   They have just -- as I mentioned, maybe

21 just a couple of distant signals. And those signals

22 don't happen to have any religious programming. Yet,

23 you see a positive value.

24   That's where the difference in the

25 treatment of religious and PBS comes. The religious,

1   they were asked about value for religious, religious,

2   even if they didn't carry any religious programming.

3   They weren't just zeroed out.

4   Q   Well, what about, for example, syndicated

5   programs? You see some zeros there. And news

6   programs, you see some zeros there. Do you think it's

7   likely that distant signals had no syndicated series

8   on them, no news programs, no religious programs?

9   A   I really don't know. I understand some of

10   the systems carry just one signal and distant signal.

11   I just don't know enough about the programming on

12   these stations to answer that question. If you only

13   carry one station, it doesn't seem to me absurd that

14   you might not have syndicated or news, but I just

15   don't know.

16   Q   Now, what does the threshold relate to?

17   Does the threshold mean -- is another means of saying

18   this that it's -- is it equal to some dollar figure or

19   some cost figure?

20   A   Well, they're asked about how they would

21   allocate a budget. And these are percentage shares of

22   budget they're mentioning allocating.

23   Q   So, for example, could we say that if the

24   cost of a PTV program was 20 percent of the program

25   budget, then we would expect that no one would take --

1   none of the 27 respondents would take a PTV station

2   because they have a 15.4 threshold?

3   A   No. They're -- some of them, several of

4   them, have reported share values at 20 or above.

5   Q   I just meant on average. I don't want to

6   go through each one of them separately. But on

7   average is that what you are saying here?

8   A   Could you repeat it with the average part,

9   please?

10   Q   All right. Let's do it separately, much

11   simpler. Let's go to Respondent Number 1 on Exhibit

12   40, Page 1. Okay? That respondent said PBS was 20

13   percent value; correct? And that's what you

14   determined as the threshold; correct?

15   A   Well, no. The x value that I have been

16   talking about is 10 for --

17   Q   In that situation?

18   A   But, as I mentioned, as I discussed

19   yesterday, even that is not the PBS threshold. It's

20   something larger than that.

21   Q   Is the PBS --

22   ARBITRATOR WERTHEIM: Excuse me a second.

23   Doctor, how could you be so sure that 10 is the

24   threshold for Operator Number 1? I take it you were

25   picking that number because it was the lowest number,

1 lowest value given to any of the categories. Is that

2 right?

3   THE WITNESS: Yes.

4   ARBITRATOR WERTHEIM: But a moment ago you

5 explained to us in that religious column where the 10

6 appears, we don't know whether that could be an

7 operator who gave religion a value of 10 but had a

8 threshold higher than 10 and that that's a big

9 difference, therefore, between the religious or any of

10 the other categories except Canadian and PBS, which

11 had no opportunity to express that value. Is that

12 right?

13   THE WITNESS: Yes.

14   ARBITRATOR WERTHEIM: So, in fact, you're

15 now telling us that by that way of looking at it, the

16 threshold for Operator Number 1 may have been some

17 number higher than two?

18   THE WITNESS: It could have been.

19   ARBITRATOR WERTHEIM: Is that consistent

20 with your selecting 10 as the threshold or minimum for

21 that operator?

22   THE WITNESS: Yes. These x values which

23 I'm calling thresholds and are -- they're calculated

24 according to a rule. As you know, it's the minimum

25 for the non-zero values for each operator.

1   And I view these as proxies for the real

2   threshold of interest, which for PBS is -- which for

3   operators considering PBS is the threshold for them to

4   bring in a whole channel, which, as I discussed

5   yesterday, is going to be greater than these so-called

6   thresholds that I've defined.

7   So let me say that one point is the real

8   thresholds of interest for PBS are larger than what

9   I've called x thresholds. That's understood. And

10   it's not a problem with the approach. It does require

11   you after you get the answer to sit back and say it's

12   an underestimate. That's what I went through at the

13   end of the day yesterday.

14   Now, you're perfectly correct that this

15   operator could have a real threshold of 13. So that

16   for that operator this terminology would be inaccurate

17   to that degree. But the approach here does not depend

18   upon having perfect answers for these.

19   I don't have to claim, the model does not

20   rest upon a claim, that these are the gospel, that

21   they're perfectly measured, that these are the

22   thresholds and this is it and this is the way you find

23   thresholds for categories.

24   What it really rests on is that it's

25   sensible to think that the real PBS threshold is

1   positively associated on average with these x values

2   so that you can use these x values as a proxy for the

3   thing you'd really like to talk about, which is the

4   real PBS threshold for bringing in a whole channel, as

5   opposed to some percentage of programming, the notion

6   being that if a operator -- operator is not going to

7   consider a value below 20. If you see that their

8   minimum value, minimum amount of zero value is 20,

9   then they probably have the high threshold.

10   It could even be higher than 20 for the

11   reason you mentioned, that even though they put down

12   20, it's conceivable they didn't even carry that

13   program category. It seems doubtful, but we don't

14   know that.

15   So in the end, like a lot of constructs

16   both in social science and in science, this notion of

17   a threshold here is a construct that has a

18   plausibility that the measurement -- let me say that

19   the threshold concept is very sensible and reasonable

20   in something like that, I think. And I don't have to

21   be an expert in cable to say this. I think that's

22   clear. I don't think that's arguable, really.

23   But the measurement of it by this rule --

24   and I referred to it a couple of times yesterday as a

25   rule for a reason. This is a plausible rule. It's a

1   rule you think is related to real thresholds, but I

2   don't advertise it as some kind of very accurate or

3   gospel measurement.

4   And I will repeat again that I said

5   yesterday the proof of the pudding really is in the

6   eating here, that using this sensible concept of a

7   real threshold and then using measurements of x values

8   that we have for all the operators that are certainly

9   reasonable to expect are associated with the real

10   thresholds, we can get out an answer that's

11   reasonable.

12   And I mentioned one piece of evidence for

13   the connection between these x measurements that we

14   made and the real thresholds of interest was that if

15   you look at the 27 operators carrying PBS who were

16   asked for -- who carried PBS, their threshold is --

17   their x threshold is -- measurement construct is

18   lower, around 7 and 7.6.

19   And the -- whereas, if you look at the

20   balance of the operators who did not carry PBS, the

21   other 146, theirs is around 12, almost double. So you

22   have quite a difference reflected here in this x

23   measurement. That's strongly corroborative of the

24   value of this x measurement, says it's captioned

25   something about the real threshold.

1   ARBITRATOR WERTHEIM: Thank you.

2   BY MR. LANE:

3   Q   Trying to go back; let's look at Number 3

4   on Exhibit 40, Page 1. The threshold there is five.

5   Is that correct?

6   A   Yes.

7   Q   And that is the same as the PBS value in

8   that instance?

9   A   Yes.

10   Q   Now, what is that telling us? If it cost

11   that operator less than five percent of its budget,

12   programming budget, that operator would take a PBS

13   station?

14   A   Well, that's the literal interpretation,

15   the meaning of the threshold, as an x value. But I've

16   just discussed how in general the real PBS threshold

17   for bringing in a whole channel maybe will be higher

18   typically.

19   Q   But in this case, this is a case where

20   I've selected it because the threshold and the PBS

21   value are the same. So we don't have to worry about

22   two different numbers; right?

23   A   Yes.

24   Q   Now, when you say that the threshold for

25   taking in a PBS station will be higher, I guess I'm

1   confused. You keep saying that the 27 had a threshold

2   of 7.6, which is lower than the threshold, that the

3   146, as you keep putting it, have almost doubled that

4   threshold at 12.

5   So I'm confused by what -- what do you

6   mean that the threshold is higher when by your own

7   numbers the threshold for the PBS respondents is lower

8   than the threshold for respondents without PBS?

9   A   Oh, I see. Two different meanings of

10   higher there. There are two different comparisons

11   being made, same meaning of higher, but it's being

12   applied to two different comparisons.

13   If you look down at the PBS column here in

14   Exhibit 40, Page 1 -- or excuse me. Not that column.

15   If we imagine, as I suggested yesterday, that we put

16   a column over on the right that records the minimum

17   non-zero value for each operator, those are by

18   definition the x values. I'm saying that PBS -- the

19   real thresholds for bringing in PBS complete signal

20   are higher than those values for each operator.

21   So you go down the line. Operator 1, the

22   minimum is 10. And the PBS threshold value is higher

23   than 10. Operator 2, the minimum is --

24   Q   Wait. Could I just stop you with that

25   first one? So you're saying there's a different value

1   for the PBS threshold than the threshold that came up

2   with the 10.8 number?

3   A   Yes.

4   Q   Okay.

5   A   Should I continue with my answer?

6   Q   Sure.

7   A   Okay. So if you look for each operator,

8   the -- for each row, then, that the threshold they

9   have for bringing a whole signal is bigger than the

10   threshold they have for bringing in a program category

11   that may just come along with a signal they had for

12   other reasons.

13   And, as I explained yesterday, those

14   numbers we have much less evidence for, much less of

15   a handle on. That's why I retreated back to something

16   that could be measured, the x's. And it works.

17   That's the logic.

18   Now, what's the other application of the

19   word "higher"? If -- among all the 173 operators here

20   imagine we had the full table of 173 rows. If we pick

21   out in the column of the x's the minimum values, the

22   27 operators who carried PBS, and we just get the

23   simple average of those 27 x values, that average I

24   believe is 7, I think.

25   Judge Wertheim got 7.6 by averaging the

22.   So that average is seven. If you look at the
balance, 146 operators, their average for those x
values is around 12. And 12 is higher than 7. So
it's quite consistent.

Q   Now, did you consider factors such as
differences in the stations that are available locally
to each of these systems when you did your analysis?

A   It sounds like a level of detail I didn't
get into unless you have something specific in mind.

Q   Well, did you look at -- for example, the
146 stations may have all had a local Public
Television station in their market, and these may not
have, for example. Did you look at that factor?

A   No, I didn't. It would be many reasons.
That would certainly appear to be one of them as to
why the 27 chose to bring in a PTV distant signal.

Q   And you didn't consider any of those?

A   No. This model is a general method of
estimating missing values and data of this kind, where
you can postulate some threshold effect. I'm sure
that I'll venture to say this same model could be
employed in a lot of market research contexts and
probably a lot of other contexts because the concept
of the threshold is a very ubiquitous concept in all
of science and social science.

1   So I dare say that this method has a wide

2   application, but it's a generic method.   It's a

3   statistical method. It's a statistical tool. And it

4   doesn't rest upon a lot of detailed understanding or

5   properties of the cable systems themselves.   It

6   abstracts away from that.

7   MR. LANE: Thank you. Those are all the

8   questions I have, Mr. Chairman.

9   CHAIRPERSON JIGANTI: Thank you, Mr. Lane.

10   MR. GARRETT: Good afternoon, Dr. Fairley.

11   I'm Bob Garrett, and I represent the Joint Sports

12   Claimants.

13   CROSS-EXAMINATION

14   BY MR. GARRETT:

15   Q   Do you remember who once said, "It's a

16   fine mess you've got us into now, Ollie?" Does that

17   sound familiar to you?

18   Let me ask you this, Doctor.

19   A   I can't imagine who you're talking about.

20   Q   This automatic zero issue arises, as I

21   understand it, because the respondents to the Bortz

22   survey were asked to value distant Public Television

23   stations only where they actually carried distant

24   Public Television stations; correct?

25   A   Correct.

1   Q   And if the Bortz respondents had been

2 asked to value PBS programming and distant signals,

3 regardless of whether they actually carried distant

4 Public Television signals, the automatic zero issue

5 would not arise; correct?

6   A   Yes.

7   Q   Now, you're familiar with Mr. Trautman of

8 Bortz and Company, are you not?

9   A   Yes.

10   Q   And did you review the testimony that he

11 submitted in this proceeding?

12   A   Not in depth, but I did look at it, yes.

13   Q   Let me just hand you a copy of what has

14 already gone in the record here as Joint Sports

15 Claimants Exhibit 3. It is entitled "History and

16 Analysis of the CRT Cable Operator Surveys, 1978 to

17 1993, by Bortz and Company."

18   A   Oh, yes.

19   Q   You've seen that document before?

20   A   Yes.   And there's some interesting

21 material in here, too.

22   Q   Now, are you aware, having read that

23 report by Mr. Trautman, that the Research Department

24 at BBD&O had done cable operator surveys for the Joint

25 Sports Claimants in connection with the 1978, 1979,

1   and 1980 proceedings?

2   A   Yes.

3   Q   Were you aware that those 1978 to '80

4   surveys asked cable operators to value distant signal

5   program categories?

6   A   Yes.

7   Q   Were you aware that those surveys did not

8   identify the particular distant signals carried by the

9   respondent systems?

10   A   No. I don't -- okay. I may have been

11   aware of that at some time, but --

12   Q   Let me just ask you to turn to Page 2 of

13   the JSC Exhibit 3. And under the section -- I'm

14   sorry. Page 2 deals with the 1978 BBDO survey;

15   correct?

16   A   Correct.

17   Q   And on Page 2 you'll see a discussion of

18   various criticisms that were made of the 1978 survey

19   done by BBDO; correct?

20   A   Yes.

21   Q   And let me direct your attention to the

22   bulleted item here identified "station listings." Do

23   you see that?

24   A   Yes.

25   Q   Can you just read that into the record?

1   A   "Although providing system by system

2 carriage summaries to MSO respondents would have been

3 impractical, no attempt was made to inform respondents

4 of the distant signals to which their responses

5 applied."

6   Q   And that was one of the criticisms that

7 was leveled against the original cable operators

8 survey for these proceedings; correct?

9   A   Yes.

10   Q   And, if I direct your attention to Page 4,

11 which is dealing with the 1979 BBDO survey and ask you

12 to read the bulleted item under criticisms labeled

13 "station listings," could you just read that?

14   A   "No information regarding the distant

15 signal stations actually carried in 1979 was provided

16 to either MSO or system respondents."

17   Q   And that was a criticism, again, that was

18 leveled against the 1979 cable operator survey;

19 correct?

20   A   Yes.

21   Q   Now, are you aware that one of the changes

22 that Mr. Bortz made when he was first retained in

23 connection with the 1983 proceeding was to actually

24 identify distant signals that the respondents carried?

25   A   I understood that that was a feature from

1 the beginning.

2   Q   And that that same change was also made by

3 ELRA, who had done a survey on behalf of the National

4 Association of Broadcasters in the 1983 proceeding.

5 Do you recall that?

6   A   No.

7   Q   But it's that -- I'm sorry.

8   A   I mean, I don't recall that it wasn't the

9 case. I just don't have that fact in my mind. Maybe

10 it was a fact.

11   Q   Well, earlier we had spent some time

12 discussing a portion of the CRT's 1983 decision. Do

13 you recall that? Page 5, Footnote 5, do you recall

14 that discussion?

15   A   This is in my testimony. Yes, sir.

16   Q   Yes.

17   A   Right.

18   Q   In fact, that portion that you quote from

19 the 1983 CRT final determination dealt with the NAB

20 survey; correct?

21   A   Correct.

22   Q   If Bortz and ELRA had not made the change

23 that they made in that 1983 survey, then that would be

24 correct in concluding that this automatic zero issue

25 would not arise?

1   A   That's correct.

2   Q   Is it your testimony that a better

3 approach would be to go back to the way that the

4 survey was done in the 1978, '79, and '80 proceedings,

5 where the distant signals that respondents carried

6 were not identified?

7   A   I'm not sure which is better. In response

8 to another question from Mr. Lane, he asked me how I

9 might reword the question about relative value. And

10 I said I would -- I might keep the reference to the

11 stations actually carried but simply eliminate an

12 implication to Question 4(a) that they had to have

13 carried every program category that they were being

14 asked to respond to.

15   So that still retains the -- what I think

16 is the major change from '83 and the early years,

17 which is simply to list for them as a way of fixing

18 their attention and focus, making that question mark

19 concrete, reminding them perhaps of the stations they

20 did carry.

21   So that, you know, just -- I'm not an

22 expert in the wording of surveys. So if you ask me,

23 I just have to give you, you know, a nonexpert opinion

24 as to how it strikes me. And it strikes me that it

25 may be useful or it may make no difference.

1 I think the only way you find that out is

2 to ask it both ways, not necessarily the same

3 operators because that presents some problems but ask

4 it both ways and then see if you really do get any

5 different answers.

6 Q   And another option I assume would be to

7 keep the wording the way it is and allow you to do the

8 missing valuation calculations that you've done here?

9 A   Yes.

10 Q   When were you first asked by PBS to review

11 the 1990 through 1992 Bortz surveys?

12 A   I really can't remember, but it was one to

13 two years ago.

14 Q   One to two years ago?

15 A   Somewhere in that time frame.

16 Q   It sounds like about when these

17 proceedings began. I gather from a response that you

18 gave to Judge Farmakides yesterday that your

19 assignment from PBS was not limited to considering the

20 automatic zero issue. Is that correct?

21 A   Yes.

22 Q   What exactly were you asked to do by PBS

23 with regard to the 1990 to '92 Bortz surveys?

24 A   I think originally I was asked to review

25 them on their behalf and come back with my comments

1   about the surveys.

2   Q   And you referred yesterday to a checklist

3   that you had. Do you recall that?

4   A   Yes.

5   Q   This is a checklist that you routinely use

6   for evaluating survey research?

7   A   Yes.

8   Q   When did you develop that checklist?

9   A   At different editions of it. I think

10   probably 10 years ago.

11   Q   Have you refined it over time?

12   A   I think so, yes.

13   Q   And after going through your checklist,

14   the only issue that you've raised here in your

15   testimony is the automatic zero issue; correct?

16   A   Yes. I mean, I would have -- you can --

17   minor points here and there. I don't think anyone is

18   going to do a survey the same way, but that's the --

19   that's really what I saw as a problem with the survey.

20   I didn't see something else in the design or execution

21   survey that was a problem like that.

22   Q   Okay. Could you briefly identify what

23   items are on your checklist? Would that take very

24   long?

25   A   I don't think it would take too long. As

1   a matter of fact, yesterday after I made that

2   statement I said I knew I hadn't brought the

3   checklist, but I jotted down from memory I'm sure the

4   major items on it. I don't -- right here I could just

5   run through them.

6   Q   Well, if you could just briefly summarize

7   the types of things that you look for in evaluating

8   survey research?

9   A   Okay. Well, I start out asking: What's

10   the aim of this survey? What are you trying to learn?

11   What are you trying to get at?

12   Second is related. What are the

13   measurements you're going to take? And what is their

14   aim? And is it well-calculated to answer the question

15   of interest that the survey sponsors have in mind?

16   Third question is: Can it answer those

17   questions? Is it a type of measurement process that

18   is likely calculated to achieve the aim of the

19   measurements?

20   Fourth is: Is the sampling frame

21   specified? And is it clear? In this case the

22   sampling frame is a list of Form 3 stations. Is there

23   a target population specified? That's the population

24   of stations that you want to understand. That's in

25   this case the same as the group on the -- I think it's

1   the same as the group on the sampling frame.   It's

2   very close to it.

3   I think -- I can't recall now.   Maybe

4   there were a very Form 3 operators that you wanted to

5   find out about that weren't on the frame or, vice

6   versa, that were on the list but you couldn't -- yeah.

7   You couldn't -- some of them the forms

8   weren't available in time, as I recall. So they're on

9   the frame.   These operators are on the frame, but

10   they're not -- they're not in the sample population.

11   Excuse me.   The next item on the list.   You can't

12   sample them because you didn't get the forms in time.

13   And there were a few of those.

14   But the target population I think is

15   identical to the sampling frame. the sample design,

16   is that -- is it a good design?   Does it lead to

17   unbiased estimates?   Does it lead to sufficiently

18   precise estimates?

19   Sample size. Is it big enough to get the

20   precision you want? Non-response, a slip between the

21   cup and the lip. Is it such a magnitude or such a

22   nature   as   to   indicating   problem   with   the

23   generalizability of the sample members that you chose.

24   Measurement accuracy and reliability. Are

25   they   --   how   accurate   and   reliable   are   the

measurements? And, finally, calculations. Are the

calculations correctly executed?

Q   And you evaluated the 1990. through 1992

Bortz surveys against all of those criteria?

A   Yes.

Q   Are there any other criteria that you

think would be important to use in evaluating the

Bortz survey?

A   I don't think there's any major criterion.

My list is longer, but I think that is because it sort

of elaborates on these.

Q   Incidentally you mention in there the fact

that Bortz was unable to get the statement of account

forms for certain cable systems. Do you recall that?

A   Yes.

Q   I'll just clarify exactly what that issue

is. Let me hand you a copy of the testimony of Paul

I. Bortz in this proceeding dated August 16th, 1995.

Did you review that testimony?

A   Yes.

Q   I'll just direct your attention to Page

19, where he's discussing the sampling procedures for

the 1989 to 1992 surveys. Do you see that?

A   I see what you're pointing to, just --

yeah, right.

1   Q   And I direct your attention to Footnote 6.

2 That discusses the problem that you referenced there

3 about not obtaining statements of account for certain

4 cable systems. Do you see that?

5   A   Yes.

6   Q   Could you just describe for the record

7 here exactly what that problem was?

8   A   Initially that the sample pulled had 249

9 systems but 14 systems were discarded due to a lack of

10 complete signal data because the statements of account

11 could not be located at the Copyright Office at the

12 time of survey.

13   Also one system was destroyed because it

14 carried no distant signal. And two of the systems

15 were determined to actually be the same system, just

16 different records.

17   Q   And so with respect to those systems that

18 you just identified there, no effort was then made by

19 Bortz or, more specifically, Burke Market Research to

20 contact the potential respondents; correct?

21   A   Right.

22   Q   And could one use the approach that you've

23 described here today to estimate the allocations that

24 those respondents would have given had they been

25 contacted?

A   Well, you can use certainly some approach to as many missing values. I'd have to look at it longer to see whether I thought this was the approach of choice, but certainly some such method could be used.

Q   Do you think it would be necessary to estimate the missing values in that case?

A   Well, you know, I can't give a complete answer to that because I think I don't have all -- quite enough information to do that. I would doubt it. I mean, typically there's hardly a survey around that doesn't have some non-response or some missing records.

And this is a small proportion of the total in the sample. Very rarely do you see people going back and doing something because it's viewed as negligible or likely to be negligible. So I would -- a priori I would doubt it.

ARBITRATOR FARMAKIDES: Could you clarify that, sir? When you say that it's a very small percentage of the total, what do you mean? In other words, you were suggesting you could not do it in this case because it was a very small percentage of the total. What does that mean in here?

THE WITNESS: Oh, I could do something.

1   ARBITRATOR FARMAKIDES: You could?

2   THE WITNESS: Yeah. It's just that --

3 "small" doesn't mean I can't do something. It just

4 means it may not be worthwhile. If you had some

5 reason to think these 14 systems were radically

6 different from the others, then it could be important,

7 although they're just a shade over 5 percent of the

8 systems. So we're talking about at most a kind of

9 five percent effect.

10   And you may or may not regard that as

11 negligible. Maybe it is, maybe it isn't. But that

12 would be the maximum effect if they're somewhat

13 different from the 249, but in terms of the shared

14 responses they'd give maybe they're rather different

15 still. It's not going to cause a five percent effect

16 if --

17   ARBITRATOR WERTHEIM: When you say "five

18 percent," do you mean an absolute five percent?

19   THE WITNESS: Yeah. I'm just taking --

20   ARBITRATOR WERTHEIM: If a reported share

21 is 20 percent and you wanted to allow for this missing

22 5 percent, would that make it somewhere between 15 and

23 25 percent or would it be 5 percent of 20 percent?

24 Would it reduce the 20 down to some 19 or whatever

25 that fraction is?

1   THE WITNESS: No. I'm talking about 19.5

2 to 20.5.

3   ARBITRATOR WERTHEIM: Okay. Thank you.

4   THE WITNESS: Yeah. So it would be -- you

5 know, it just rarely happens that you'd have even 50

6 percent of that 5 percent effect. So you'd have two

7 and a half percent effect or less almost every time.

8   ARBITRATOR WERTHEIM: Thanks.

9   BY MR. GARRETT:

10   Q   Dr. Fairley, in connection with your

11 review of the 1990 through '92 Bortz surveys, did you

12 request any of the data underlying those studies?

13   A   Yes.

14   Q   What did you request?

15   A   I requested the kinds -- first of all, the

16 kind of data that's found in my Exhibit 40, but for

17 all of the 173 respondents in '90 and for all of the

18 other respondents in the other 2 years.

19   And, in addition to that, in order to

20 check the calculations that were made of the

21 stratified share estimates, I requested system revenue

22 data and received a -- there was a problem of

23 confidentiality there.

24   So we got around that by a device which is

25 fairly common of the Bortz Company statistician added

1   a random number to each random figure, small random

2   number, small percentage terms. And some would be a

3   little lesser, would be a little lesser.

4   Then they gave me those revenue data so

5   that you couldn't find -- there wouldn't be a

6   signature for who the operator was. So you couldn't

7   go back to the Copyright Office and say, "Ah. Now I

8   know what their answers are."

9   And for purposes of checking the

10   calculations, that was adequate. I only wanted to see

11   if they're coming out in reasonably close to the

12   answers. It wasn't essential to get down to second

13   decimal places.

14   Q   You raised a couple of issues there.

15   First of all, with respect to Exhibit 40 and the data

16   contained therein, do you recall approximately when

17   you received that data from the Joint Sports

18   Claimants? Let me just direct your --

19   A   One to two years, one to two years ago.

20   Q   I was going to say let me just direct your

21   attention to that exhibit. There's a reference there

22   to having received something from Bortz and Company on

23   February 27th, 1995. Do you see that?

24   A   Oh, yes.

25   Q   Does that indicate that, in fact, these

1 data were supplied to you on February 27th, 1995 by

2 the Bortz Company?

3   A   I think this data contained some revisions

4 from earlier sets sent.   There were some missing

5 values or corrections that needed to be made.   So I

6 think this may have been the last date that I received

7 it.

8   Q   So you began receiving data from Bortz and

9 Company, underlying data from Bortz and Company, at

10 some point prior to February 27th, 1995; correct?

11   A   Yes.

12   Q   And did you recall receiving any data from

13 Bortz and Company after February 27th, 1995?

14   A   I don't recall if these disguised figures

15 I mentioned earlier were received after that or not or

16 before.

17   Q   And when you said the disguised figures,

18 you're talking now about the issue of protecting the

19 confidentiality of individual respondents?

20   A   Yes.

21   Q   Is that unusual to want to protect the

22 confidentiality of individual respondents in survey

23 research?

24   A   No.

25   Q   Did the manner in which Bortz and Company

1   protected the confidentiality of the respondents and

2   provide you with data impair your analysis in any way?

3   A   No.

4   Q   Joint Sports Claimants also made Mr.

5   Trautman of Bortz and Company available to answer any

6   questions that you had on the Bortz studies; correct?

7   A   Yes.

8   Q   You had several conversations with Mr.

9   Trautman where he answered questions that you had with

10   regard to those studies?

11   A   I did.

12   Q   And those all took place during

13   approximately what period of time?

14   A   I think the last time might have been just

15   a few months ago, several months ago, and then the

16   earliest possibly a year and a half ago, something

17   like that.

18   Q   Approximately how much time did you spend

19   analyzing the Bortz studies and underlying data?

20   A   And you're talking about me personally?

21   Because I have a research assistant and also a couple

22   of graduate students in statistics at the University

23   of Pennsylvania Wharton School who sometimes have

24   worked with me on this project.

25   Q   Let me ask you first personally.

1   Approximately how much time did you spend analyzing

2   the Bortz studies and underlying data?

3   A   This could be off by a substantial

4   fraction, but I would just mention, I guess, on the

5   Bortz studies maybe two weeks of time maybe. Yeah.

6   Probably more if you include -- if you talk about

7   developing this model and all the variants of it and,

8   you know, carrying it all the way through, it's

9   probably more than that.

10   Q   And when you say two weeks, you're talking

11   about 80 hours?

12   A   Yes.

13   Q   And how much time was spent by those who

14   assisted you in this project?

15   A   Oh, probably maybe as much as four or five

16   times that much because this is very labor-intensive

17   work to get the data into the computer in the right

18   way and right files, to manipulate it, to compute

19   these functions, to rate these functions, to prepare

20   various memoranda about this or that aspect that I

21   asked them to do, and so forth.

22   So I'd say probably my time is higher than

23   I said, maybe even double if you're counting work in

24   writing it up and so on. And their time would be four

25   or five times that.

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1   Q   And over what period of time, now, did you

2   actually analyze the Bortz study and the underlying

3   data?

4   A   Until fairly recently and going back for,

5   you know, on the order of a year and a half.

6   Q   And if I just direct your attention to

7   Table 1 in your testimony, the subject of discussion

8   during the past few days? Do you have that before

9   you, Doctor?

10   A   Yes.

11   Q   Could that table have been prepared in its

12   current form without the Joint Sports Claimants having

13   provided you all of the underlying data to the Bortz

14   surveys in a timely manner?

15   A   No.

16   Q   You had a discussion yesterday afternoon

17   with Judge Wertheim concerning sampling and

18   uncertainty in estimates. Do you recall that?

19   A   I'm not sure which one. No, I don't

20   recall exactly.

21   Q   Let me do it this way. Let me give you a

22   copy of Mr. Bortz's testimony in this proceeding. I

23   direct your attention to Pages 18 to 19 of that

24   testimony. Do you have that before you?

25   A   Yes.

1   Q   That discusses the sampling plans that

2   were employed in connection with the 1990 to '92

3   surveys; correct?

4   A   Correct.

5   Q   And you did review that portion of Mr.

6   Bortz's testimony; correct?

7   A   Yes.

8   Q   Let me also hand you JSC Exhibit 3, which

9   is the report prepared and sponsored by Mr. Trautman.

10   I direct your attention to Page 33 of that report.

11   There Mr. Trautman discusses the sampling plan that

12   was used in connection with the 1991 survey; correct?

13   A   Right.

14   Q   Incidentally in the testimony, in the

15   Bortz testimony that I just referred you to, Mr. Bortz

16   discusses the sampling plan for the 1989 and 1992

17   surveys; correct?

18   A   I'm sorry. I didn't hear that last

19   sentence.

20   Q   I direct your attention to Pages 18 to 19

21   of Mr. Bortz's written testimony.

22   A   Yes.

23   Q   And I think we've already established that

24   that deals with the sampling plans; correct?

25   A   Right.

1   Q   And those are the sampling plans for the

2   1989 and 1992 Bortz surveys; correct?

3   A   Yes.

4   Q   And then on Pages 33 and 34 of the

5   Trautman report, Mr. Trautman deals with the sampling

6   plans for the 1991 survey; correct?

7   A   Right.

8   Q   And you had previously reviewed that?

9   A   Yes.

10   Q   Did you find anything inappropriate about

11   the sampling plans that were employed in connection

12   with the 1990, '91, and '92 surveys as described there

13   by Mr. Bortz and Mr. Trautman?

14   A   Yes.

15   Q   Did you find anything about those sampling

16   plans that was likely to bias the results of the

17   survey?

18   A   No.

19   Q   Would it be fair to say that those

20   sampling plans followed standard and professionally

21   accepted sampling procedures?

22   A   Yes.

23   Q   Now, Mr. Bortz and Mr. Trautman talk about

24   their use of a stratified random sample. Do you

25   recall that?

1   A   Yes.

2   Q   Are you familiar with the concept of

3 stratified random sampling?

4   A   Yes.

5   Q   Is stratified random sampling a standard

6 and professionally accepted sampling procedure?

7   A   Yes.

8   Q   Did you find anything about the use of the

9 stratified random sampling procedure that was

10 inappropriate in this case?

11   A   No.

12   Q   Now, also on Page 18 of the Bortz

13 testimony, there's a discussion of something called

14 Neyman's allocation formula?

15   A   Yes.

16   Q   Are you familiar with that?

17   A   Yes.

18   Q   Now, is that Neyman's allocation formula

19 a standard and professionally accepted form of

20 statistical analysis?

21   A   Yes.

22   CHAIRPERSON JIGANTI: Mr. Garrett, I think

23 we'd better take a recess at this time, take a

24 10-minute recess.

25   (Whereupon, the foregoing matter went off

1   the record at 4:02 p.m. and went back on

2   the record at 4:13 p.m.)

3   CHAIRPERSON JIGANTI: You may proceed, Mr.

4   Garrett.

5   BY MR. GARRETT:

6   Q   Dr. Fairley, we were talking about

7   Neyman's allocation formula. Do you recall?

8   A   Yes.

9   Q   And you're familiar with that formula?

10   A   Yes.

11   Q   Was there anything inappropriate about its

12   use in the context of the 1990-92 Bortz surveys?

13   A   No.

14   Q   Or anything about the use of that formula

15   that was likely to bias the results of those surveys?

16   A   No.

17   Q   On Page 18 of Mr. Bortz's testimony, he

18   also talks about the cum square root of F rule. Do

19   you see that?

20   A   I know that he's talked about it. I don't

21   see it on the page. Which line is it?

22   Q   It's in the third full paragraph on Page

23   18.

24   A   Yes.

25   Q   And you're familiar with that rule?

1   A   Yes.

2   Q   Is there anything inappropriate about its

3 use in the context of the 1990 to '92 surveys, Bortz

4 surveys?

5   A   No.

6   Q   Is there anything about its use that would

7 be likely to causae bias in the results of those

8 surveys?

9   A   No.

10   Q   Doctor, would it be fair to say that

11 whenever you use a sample for a survey that there's

12 going to be some uncertainty surrounding the results

13 of that survey?

14   A   Certainly.

15   Q   And it is possible, is it not, to

16 calculate sampling error?

17   A   Yes.

18   Q   Did you review the manner in which Mr.

19 Bortz or Bortz and Company calculated the confidence

20 intervals in the sampling error for the 1990 to '92

21 surveys?

22   A   Yes.

23   Q   Was there anything inappropriate about the

24 way in which they made those calculations?

25   A   No.

1   Q   Now, you had to calculate your own

2 confidence intervals to account for this zero value

3 adjustment; correct?

4   A   Correct.

5   Q   Did you calculate those confidence

6 intervals in a way different than Bortz and Company

7 calculated their confidence intervals for the entire

8 survey?

9   A   Yes.

10   Q   What was the reason for doing it

11 differently?

12   A   Because I was using this probability model

13 and getting the estimate through the maximum

14 likelihood method. And that method has associated

15 with it a specific procedure for estimating confidence

16 intervals or standard errors from which you get

17 confidence intervals. So I followed that specific

18 procedure.

19   Q   You only calculated confidence intervals

20 for the PBS share; correct?

21   A   That's right.

22   Q   Now, does that affect the -- does your

23 calculation of those confidence intervals in any way

24 affect the confidence intervals surrounding the shares

25 for the non-PBS program categories?

1   A   No.

2   Q   Just so we're clear, Mr. Bortz in his

3 testimony does provide the confidence intervals

4 surrounding the original allocations; correct?

5   A   Yes.

6   Q   And in Exhibit 20 -- do you have your

7 Exhibit 20, PTV Exhibit 20, before you?

8   A   No.

9   Q   I know you're not sponsoring that exhibit,

10 Dr. Fairley, but you have seen it before, haven't you?

11   A   Yes.

12   Q   And Exhibit 20 provides the adjusted

13 shares for the 1990 to 1992 Bortz surveys; correct?

14   A   Right.

15   Q   And by "adjusted shares," I mean the

16 shares that take account of your automatic zero

17 adjustment; correct?

18   A   That's right.

19   Q   I'm just a little bit unclear here as to

20 what the confidence intervals are around those numbers

21 there. Do we simply use the Bortz and Company

22 confidence intervals for the original allocations or

23 are they modified in some way?

24   A   They'll be very close. I'm just -- now,

25 they might be modified.

1   Q   Would one have to do a set of calculations

2 that you have not already done?

3   A   That's right. I can say confidently that

4 they're very close, talking about a very small effect

5 on them.

6   Q   And when you say "very close," what do you

7 mean?

8   A   Oh. Well, they might -- five percent. So

9 it's -- if the confidence interval was 4 to 8 to 4,

10 maybe it's 4.2 or 4.1 to 8.1 or 8.2, something on that

11 order.

12   Q   Would it be possible for you to do those

13 calculations and provide them for the record?

14   A   Yes.

15   ARBITRATOR WERTHEIM: You're referring now

16 to the confidence intervals for all the categories

17 here except PBS or are you including PBS?

18   THE WITNESS: For PBS we have confidence

19 intervals.

20   ARBITRATOR WERTHEIM: Those are in your

21 Table 1?

22   THE WITNESS: Yes. But, actually, to

23 apply a consistent methodology, I would take -- I'd

24 have to think about it, but I might take the

25 confidence intervals that were quite similar that

1   Sports had and use those even for PBS.

2   MR. GARRETT: Mr. Chairman, can I ask that

3   the witness be requested to provide those confidence

4   intervals so that we have a standard set of confidence

5   intervals for all of his calculations?

6   MR. HESTER: We can undertake to do that,

7   Your Honor.   Mr. Garrett, does your request also

8   include Exhibit 21, where we've broken the numbers

9   down as between the 3.75 fund and basic fund?

10   MR. GARRETT: Let me· ask Dr. Fairley.

11   BY MR. GARRETT:

12   Q   Do you want to do confidence intervals for

13   that? Are you familiar with Exhibit 21, Dr. Fairley?

14   A   Yes, sir.

15   Q   Do you have confidence intervals for all

16   those numbers or could one calculate confidence

17   intervals for all those numbers?

18   A   Yes.

19   MR. GARRETT: I request that he do that.

20   MR. HESTER: Is Mr. Garrett paying for

21   that part?

22   ARBITRATOR WERTHEIM: Just to clarify,

23   you're going to be revising these exhibits anyway for

24   the Trautman's adjustments.

25   MR. HESTER: Yes.   I'm hoping by Monday

1   morning to submit revised Exhibits 20 and 21 to take

2   account of the Trautman revisions.

3   ARBITRATOR WERTHEIM: Will that give you

4   time to include in a single integrated document the

5   confidence intervals that Mr. Garrett has just asked

6   about?

7   CHAIRPERSON JIGANTI: Is there any need to

8   be that quick?

9   ARBITRATOR WERTHEIM: No.

10   MR. HESTER: If it would be all right, if

11   we could have a little bit more time on the confidence

12   intervals? They would be a separate exhibit, I would

13   suppose, anyway, if that's all right.

14   Devotional Claimants want Exhibits 20 and

15   21 so that they're in the record before their case

16   starts because the adjustments affect them.

17   ARBITRATOR WERTHEIM: That's fine so long

18   as it's clear that the confidence intervals we get

19   will apply to your revised Exhibits 20 and 21.

20   MR. HESTER: Yes, yes. That would be the

21   plan, Your Honor.

22   MR. GARRETT: I have no need for that

23   information prior to filing rebuttal cases, Your

24   Honors.

25   CHAIRPERSON JIGANTI: I'll leave it to

1 your discretion. But, now, this is going to come in

2 as your exhibit?

3 MR. HESTER: I think that would be the

4 most sensible. Dr. Fairley would sponsor it, I

5 suppose. And if some party needed to have examination

6 on it, we could make some arrangements for that. I'd

7 try to get it done promptly so that it would be before

8 we finished up on the direct cases in case anybody

9 needed to have it come back for that purpose.

10 CHAIRPERSON JIGANTI: All right. You may

11 proceed, Mr. Garrett.

12 BY MR. GARRETT:

13 Q Dr. Fairley, is it your testimony that the

14 estimates shown there in Exhibit 20 would be the best

15 estimates of how cable operators value the different

16 types of distant signal programming during the years

17 1990 to 1992?

18 A Well, that's as compared to what?

19 Q Well, we started this line of discussion

20 by talking about the uncertainty surrounding the

21 various estimates. Do you recall that?

22 A Yes.

23 Q And that uncertainty is accounted for, at

24 least in part, by the confidence intervals; correct?

25 A Yes.

1   Q   And, of course, there's a whole other set

2   of error that can always be introduced into surveys by

3   virtue of non-sampling error; correct?

4   A   Right.

5   Q   Putting aside the non-sampling error here,

6   would the estimates that are shown there in Exhibit 20

7   be the best estimates of how cable operators value the

8   different types of distant signal programming during

9   the years 1990 to 1992?

10   THE WITNESS: Well, Mr. Chairman, how much

11   more time do we have?

12   BY MR. GARRETT:

13   Q   You can't answer that question at that --

14   A   There's a short answer and a long answer.

15   I'm sure you want the short one.

16   MR. HESTER: Let's go with the short one.

17   MR. GARRETT: I sure hope I want the short

18   one.

19   THE WITNESS: The short answer is yes,

20   this is so-called point estimate from the standard

21   statistical methods that are used in the Bortz report.

22   And this is what would almost universally be provided.

23   The long answer is that what is best is a

24   large subject in statistics. In particular, sometimes

25   in the context of a legal proceeding you may take into

1   consideration risk.

2   For example, in a criminal proceeding --

3   I happen to have written some articles on criminal

4   evidence. We have a presumption of innocence. And

5   you may say, "Well, I'm not going to just take the

6   point estimate. I'm going to take -- I'm going to

7   give the benefit of the doubt to the defendant. And

8   so I'll take the lowest value or the highest value or

9   whatever it is that gives the defendant that value,

10   that benefit."

11   And even in this proceeding, I know that

12   there was at least one year when for PBS the tribunal

13   did just that. For PBS they said, "Well, it's a

14   relatively low value, but we're going to give the

15   benefit of the doubt to them because of the confidence

16   interval."

17   So I think my view -- and this is not, you

18   know, per se a statistical view, but my view is that

19   the judges, the arbitrators have to decide what is

20   best.

21   It's not a technical question. It sounds

22   like a technical question, but it's not. And they

23   have to think about these things. I don't think

24   they're bound by the point estimate, but it is true.

25   And I think this is what you were thinking

1 of when you asked me that question. I believe that

2 you're saying: Is this the usual estimate? Is this

3 the standard estimate? Is that right or --

4   MR. GARRETT: Well, I wanted to know --

5   MR. LANE: Give him the short answer, Bob.

6   MR. GARRETT: Do I have a choice between

7 these? Do you consider Mr. Bortz a defendant?

8   MR. HESTER: He's presumed innocent, Bob.

9   MR. GARRETT: Well, I hope he had that

10 presumption.

11   THE WITNESS: Let me say that I think it's

12 ominous, it's certainly best practice, in fact, yeah,

13 certainly best practice, to report the point estimates

14 and then also, as the survey does, to report the

15 confidence intervals.

16   And then if you want to take into account

17 these other dimensions of best such as risk, you can

18 do that so you don't tie the hands of the parties or

19 the decision-makers. So I think this is the way the

20 table should be reported.

21   MR. GARRETT: Okay.

22   BY MR. GARRETT:

23   Q   Let me ask it this way here. Let me ask

24 you to turn to Exhibit 40, PTV Exhibit 40.

25   ARBITRATOR WERTHEIM: Doctor, I'll bet you

1 had a very hard time with multiple choice tests when

2 you were in school.

3   (Laughter.)

4   THE WITNESS: You got it.

5   MR. GARRETT: Actually, could I borrow

6 this? Yes. Thanks.

7   BY MR. GARRETT:

8   Q   Would it be fair to say, Dr. Fairley, that

9 if we looked at the individual responses; that is, the

10 responses given by any individual respondent, that the

11 real value the respondent attached to the different

12 program categories may be something different than the

13 number the respondent actually gave? Would you like

14 that question clearer?

15   A   There are some instances that come up here

16 where that's true.

17   Q   And you discussed those earlier when you

18 talked about the zero allocations for PBS where a PBS

19 signal was actually carried; correct?

20   A   Yes.

21   Q   Let's just focus for a moment on the

22 respondent number one. He gave movies a 25 share. Do

23 you see that?

24   A   Yes.

25   Q   Now, would it be fair to say that that

1 particular respondent may actually value movies at a

2 number somewhat different than 25?

3   A   Because of the rounding phenomena, it

4 might be between, you know, probably 23 and 27, I

5 would guess.

6   Q   Okay.   So there is some uncertainty

7 surrounding each of the responses; that is, given by

8 the respondents to the survey; correct?

9   A   Yes.

10   Q   And if each of the responses has some

11 degree of imprecision, does that affect the bottom

12 line results of the survey?

13   A   I think any effect will be negligible for

14 reasons I discussed yesterday.

15   Q   Could you just briefly identify what those

16 reasons were?

17   A   You have rounding up and rounding down

18 throughout.   So you normally expect such rounding to

19 balance out.

20   Q   Now, earlier you had talked about the

21 Canadians. Do you recall that discussion?

22   A   Yes.

23   Q   And you mentioned something about the

24 Canadian signals could only be carried near the

25 border.

1   A   Yes.

2   Q   Do you recall that? And you attributed

3   that to the physical impossibility of picking up

4   Canadian signals much further from the border?

5   A   I did, yes.

6   Q   Are you familiar with 111(c)(4) of the

7   Copyright Act, which imposes restrictions on the

8   compulsory licensing of Canadian signals?

9   A   No.

10   Q   Assume for a moment that Section 111(c)(4)

11   of the Copyright Act states that Canadian signals are

12   not subject to compulsory licensing beyond the 42nd

13   parallel or 150 miles south of the U.S.-Canadian

14   border. If that is the case, Dr. Fairley, would you

15   apply your missing valuation adjustment here to those

16   cable systems who were located beyond that zone; in

17   other words, beyond 150 miles or the 42nd parallel?

18   A   I don't think so. If I understand the

19   situation correctly, the stations distant from the

20   border would not be contributing to the royalty funds.

21   Q   Let me try to state it this way. Assume

22   that cable systems located beyond this particular zone

23   identified in Section 111(c)(4) could not retransmit

24   Canadian signals pursuant to the compulsory license.

25   Okay? Will you assume that?

1   A   What does that mean?

2   Q   Assume that cable systems outside of this

3 zone could not --

4   A   Pick up the Canadian signal?

5   Q   Signal pursuant to the compulsory license.

6 They would actually have to negotiate --

7   A   Okay.

8   Q   -- with the copyright owners for the right

9 to carry it. Okay?

10   A   Right.

11   Q   Got that?

12   A   Okay.

13   Q   If that is correct, then would you apply

14 your missing valuation adjustment to cable systems

15 that are located in that zone?

16   A   Yeah.

17   Q   By "that zone" I mean the zone beyond the

18 42nd parallel or 150 miles before --

19   ARBITRATOR WERTHEIM: South of that

20 border.

21   MR. GARRETT: South of that border, yes.

22   THE WITNESS: I don't think so because

23 that would be attributing value that -- to them as a

24 way of gaining appropriate compensation for that value

25 in these proceedings from these -- the funds here.

1   And by assumption I take it from that

2   section of the copyright statute they should pay for

3   those by direct negotiation. And let's see. Yeah, so

4   that the Canadian copyright holders are compensated by

5   direct negotiation.

6   BY MR. GARRETT:

7   Q   Does that complete your answer?

8   A   Yes.

9   Q   Now, there was also a discussion about

10 devotional programming earlier this afternoon. Do you

11 recall that?

12   A   Yes.

13   Q   Do you have any factual basis for

14 concluding that any of the respondents to the Bortz

15 surveys not receive distant signal devotional

16 programming?

17   A   I'm sorry. Could you -- can you restate

18 that?

19   Q   Sure. Do you have any factual basis for

20 concluding that any of the respondents to the Bortz

21 surveys did not carry distant signal devotional

22 programming?

23   A   No.

24   Q   Do you know if there is devotional

25 programming on stations WTBS, WGN, WWOR?

1   A   I don't.

2   Q   Do you know what percentage of the

3   respondents in the survey would have received WTBS,

4   WGN, WWOR, or some combination of those three signals?

5   A   I don't know. I recognize some popular

6   signals there. I suppose it's a substantial number,

7   but beyond that I couldn't say anything.

8   Q   Okay. Dr. Fairley, by way of summary

9   here, I take it during the period of approximately one

10   to two years you reviewed the 1990 to 1992 Bortz

11   studies; correct?

12   A   Yes.

13   Q   And you requested and received from the

14   Bortz and the Joint Sports Claimants data underlying

15   those studies?

16   A   Yes.

17   Q   And you received all of the data that you

18   felt was necessary to properly evaluate those studies?

19   A   Yes.

20   Q   And you had sufficient time to analyze the

21   data that you received?

22   A   Yes.

23   Q   And representatives of Bortz and Company

24   were also made available to answer questions about the

25   studies?

1   A   Yes.

2   Q   And you evaluated those studies against

3 your standard checklist; correct?

4   A   Yes.

5   Q   And based upon your review and analysis,

6 you concluded that an adjustment should be made to

7 take account of the automatic zero issue; correct?

8   A   Yes.

9   MR. GARRETT: I have no further questions.

10 Thank you very much, Dr. Fairley.

11   CHAIRPERSON JIGANTI: Any questions,

12 counsel?

13   MR. SATTERFIELD: I have no questions.

14   CHAIRPERSON JIGANTI: Okay. Thank you.

15   ARBITRATOR FARMAKIDES: I have a question,

16 then, please.   Mr. Fairley, we've enjoyed your

17 testimony. Obviously all of us have been fascinated.

18 And I have one question I'd like to ask you looking to

19 your general expertise as a statistician, along with

20 the Bortz survey, which you have evaluated. And that

21 Bortz survey is a basis for allocating shares among

22 the parties to this proceeding. We have another

23 method that's been offered by another party, which is

24 based on the Nielsen rating.

25   Now, statistically can you share with us

1   what factors you would consider in evaluating one

2   against the other, especially if you have any

3   suggestions on how one can be integrated with another,

4   assuming that deficiencies to any curve can be

5   statistically corrected, or is that unfair? Do you

6   understand what I'm saying?

7   THE WITNESS: Yes. You're looking at the

8   Bortz survey and the Nielsen survey. I studied that

9   some, quite a bit.

10   ARBITRATOR FARMAKIDES: You have studied

11   the Nielsen survey?

12   THE WITNESS: Yes.

13   ARBITRATOR FARMAKIDES: Perhaps then you

14   could be very effective in giving us what you consider

15   to be factors that should be considered in evaluating

16   one over the other or perhaps in weighting one

17   differently than in weighting the other.

18   THE WITNESS: Yeah. I think it's a real

19   interesting question and one that statisticians have

20   been looking at a lot in really the last 10 years. I

21   think there's still a lot to find out about. It's not

22   an easy question, as I'm sure you can appreciate. In

23   this context, I -- and I've thought about this in

24   connection with these proceedings.

25   I had an economics professor, Joe Conard,

1   who is the author of one of the key books on the

2   theory of interest in the last 30 or 40 years.   And

3   he'd like to say he'd rather be vaguely right than

4   precisely wrong.

5   And from my reading of these surveys, I

6   think that's the -- I feel that that's the situation

7   that pertains here, that the Bortz survey is directed

8   at a key question in interest here that the central

9   issue is about economic value, however defined, and

10   relative values.

11   And the Bortz survey certainly addresses

12   that you might have a -- you might have quarrels with

13   how they address it, you know, in any number of ways.

14   But that's -- they're going after that aim.

15   So   right   away   they   meet   my   first

16   criterion. Is this -- are they aiming at the right --

17   the relevant thing? That's the most important thing

18   to get straight in the beginning, purposes, goals;

19   whereas, the Nielsen survey -- and I believe that they

20   have been frank in saying this -- is not.   It's

21   viewership hours or minutes. And they acknowledge

22   that this is not the whole story with value by any

23   means.

24   And you can cite a lot of the examples,

25   evidence, that advertisers just don't go down the line

1   with viewership hours. You can have some very

2   dramatic differences between viewership hours and the

3   values that they place on the program and presumably

4   the values that they think have something to do with

5   the values that cable subscribers and other viewers

6   would place or you can look at the fees of specialty

7   channels.

8   I think John Fuller of the PBS has used

9   these to talk about the differences between viewership

10   and market value as realized in actual markets so that

11   the Nielsen survey, of course, is a long-established

12   technique. You know, it's a massive operation.

13   It -- there have been lots of statistical

14   criticisms of it in the survey community. There was

15   an enormous study, which I've gone through, called the

16   CONTAM report in x volumes. I think it was 11

17   volumes, looking at every conceivable aspect of the

18   Nielsen survey. And they find some problems.

19   I'm not prepared to talk about how

20   important I think those are, but every survey has

21   problems, too. And that doesn't really say anything.

22   I guess what I'm saying is that you may be impressed

23   for good reason with the Nielsen survey for certain

24   purposes.

25   And I understand without being an expert

1 in this area that for certain advertising purposes

2 it's used and it's used to direct hundreds of millions

3 of dollars in advertising rates. So it's clearly an

4 acknowledged survey. It's been widely used.

5 But, whatever its merits in some other

6 field, it's not talking about -- it seems to me what

7 we're talking about here. It's -- at best you have to

8 have a good way of going. It seems to me you have to

9 have a way to go from viewership hours to what we're

10 talking about. Absent that bridge, I don't know what

11 you have. I mean --

12 ARBITRATOR FARMAKIDES: That's really what

13 I'm getting at, sir.

14 THE WITNESS: Yes, yes.

15 ARBITRATOR FARMAKIDES: That's the point.

16 Do you have statistical means of developing that

17 through models? I'm sorry.

18 THE WITNESS: I don't have here today such

19 a model. I can imagine ways to go about trying to

20 develop such a model.

21 ARBITRATOR FARMAKIDES: What would be the

22 factor that you would consider in developing that kind

23 of a model?

24 THE WITNESS: Well, let me say, first of

25 all, since I don't think viewership is the whole

1 story, I think it's just one factor, and possibly I --

2 possibly not the most important factor in relative

3 values.

4   So I don't think you -- I don't think you

5 can go -- let me correct or expand on what I said

6 earlier. I don't think you can go just from a Nielsen

7 survey to get a good estimate of relative value. I

8 don't think you can do it.

9   What I really meant to say was if you take

10 the Nielsen -- you might take the Nielsen survey

11 together with other surveys and that didn't encompass

12 their work or didn't already subsume their work and

13 come up with a better answer.

14   But here I'm not sure that -- at first

15 blush I don't think that's the case because the -- in

16 questioning the cable systems people that they can be

17 presumed to have a general idea of the Nielsen results

18 in a rough way.

19   So they're already -- in asking these

20 people for their opinion, they are your model, in

21 effect. They are taking in themselves Nielsen

22 advertising rates, specialty channel fees, all kinds

23 of information relevant to their business. And

24 they're processing it. And they're coming out with

25 this answer.

1   ARBITRATOR FARMAKIDES: That's very

2   helpful. Thank you, sir.

3   CHAIRPERSON JIGANTI: Mr. Hester, do you

4   have any questions?

5   MR. HESTER: I just had one, Your Honor.

6   REDIRECT EXAMINATION

7   BY MR. HESTER:

8   Q   Dr. Fairley, Mr. Lane had asked you about

9   a few occasions when, as an example, there are zero

10 values reported in your Exhibit 40 for syndicated

11 series. Do you recall that?

12   A   Yes.

13   Q   Is it consistent with your view of these

14 data that there could be occasions when a cable

15 operator was carrying syndicated series on a distant

16 signal but, nonetheless, assigned a zero value to that

17 program category?

18   A   Yes.

19   Q   Could you explain that?

20   A   Well, the -- because they may take a

21 distant signal. And they take it to get movies and

22 sports, and syndicated series came along with it. But

23 they don't really think there's any value to them in

24 that.

25   Q   So does the fact that you see zero value

1   for syndicated series require, for instance, a

2   conclusion that that distant signal didn't have any

3   syndicated series on it? Does that require -- are you

4   led to that result?

5   A   No.

6   Q   And is the situation that you see, for

7   instance, with respect to syndicated series different

8   from what you would see with Public Television in

9   terms of the cable operators' decision about whether

10   to carry the programming?

11   A   I'm sorry. Could you repeat that?

12   Q   Yes. Is there a difference between the

13   values that would be assigned to any of these

14   different program categories, such as syndicated

15   series or religious programming or any of the other

16   categories, is there a different between those

17   categories, and PBS in terms of the way you would see

18   the significance of zero values?

19   A   Yes, there is. As I've noted several

20   times, the PBS is unique among these program

21   categories in that to import it, to get this program

22   category, you have to take a whole signal; whereas, to

23   get the others, you may get some of that category just

24   piggybacking on other categories that you sought.

25   Q   Let me just follow up very quickly on a

1   question from Judge Farmakides. One part of his

2   question related to whether it would be appropriate to

3   try to average the, for instance, Nielsen results with

4   Bortz survey results. Do you recall that?

5   A   Yes.

6   Q   Now, I believe in your testimony in your

7   response to Judge Farmakides, you had said that in

8   your view the Bortz results were targeted toward

9   answering the right question. In other words, the

10   question of survey design was properly answered as to

11   the Bortz results. Is that what you had said?

12   A   Yes.

13   Q   So does that mean if I've drawn a line

14   here and if the value -- let me represent r as the

15   true value. All right?

16   A   True value for what?

17   Q   Results. If we're trying to get the true

18   value as to the --

19   A   For some study?

20   Q   For the study as to how cable operators

21   actually valued the different kinds of programming.

22   Was your point that the Bortz testimony is oriented

23   toward trying to measure that true r?

24   A   Yes.

25   Q   And so the Bortz survey might be near to

1 r along this continuum? Is that right? But it might

2 not be exactly on r because of all of the difficulties

3 involved in measurement?

4   A   Yes.

5   Q   Now, if the Nielsen survey were also drawn

6 along this same continuum, in your judgment would it

7 be further away from r? Is that the likelihood?

8   A   Yes, it is because it's not aiming at r.

9 It's aiming at something else.

10   Q   It's aiming at advertising-related value?

11   A   Yes.

12   Q   So if we were to average the results

13 between Bortz and Nielsen, what would be the

14 implication?

15   A   You would get a worse result than if you

16 took Bortz alone.

17   Q   Because you move further away from true r?

18   A   You move further away from the true r.

19   MR. HESTER: Thank you, Dr. Fairley.

20 That's all I have.

21   THE WITNESS: If I could just add one

22 brief footnote on that? Well, it's just a reference

23 you may or may not find useful. Michael Finkelstein

24 -- I believe it's in the Harvard Law Review -- wrote

25 an article. I think it's called "Uses of Models" or

"Regression Models," which are kind of statistics models, "in Administrative Proceedings" or it's a title somewhat related to that. And he dealt with a number of interesting questions about what rules should be for decision-makers like yourselves in dealing with statistical evidence.

And one of his -- I thought this was a very thoughtful article. One of his points was that if the fact-finders have two different studies in front of them, the rule is they should decide which one is best and go with that, not average them. And I think this is perfectly illustrated right here because averaging them just degrades the best one. And I could go on, but I don't think it's as relevant.

There are situations where you do on average, of course. Averaging is a powerful technique when the data is being used to estimate the same thing. And when it's not, it really doesn't make sense to average.

What are you getting? You're not estimating anything known. At least Nielsen in estimating viewership and Bortz is -- I mean, it's not as easy. I certainly doesn't think it's as easy, but less precisely. That's why that quotation was Conard I thought was good. They're trying to get at the

1   right thing.

2   So averaging them is just -- it's not

3   going to estimate any quantity that has integrity.

4   There's no quantity there.

5   ARBITRATOR FARMAKIDES: I wasn't using the

6   average. I think that was used by your counsel. I

7   think you've answered the question that I have posed.

8   Now, with respect to the Finkelstein

9   article, can you cite that? What year was it?

10   ARBITRATOR WERTHEIM: I think it's cited

11   by one of the parties.

12   ARBITRATOR FARMAKIDES: Is it? I didn't

13   see it.

14   THE WITNESS: I could get you that cite

15   easily.

16   ARBITRATOR WERTHEIM: You could always

17   call him up. He's an old acquaintance of mine.

18   ARBITRATOR FARMAKIDES: Or perhaps --

19   MR. HESTER: Your Honor, we can undertake

20   to supply that.

21   ARBITRATOR FARMAKIDES: I would like to

22   read that. Thank you.

23   CHAIRPERSON JIGANTI: Are you finished?

24   MR. HESTER: Yes. I probably should go

25   back just as a matter of housekeeping and deal with

1 these various charts so that we have that on the

2 record.

3 ARBITRATOR WERTHEIM: See if we can do it

4 briefly.

5 MR. HESTER: I think Chart 1 should be PTV

6 Exhibit 45. Chart 2 should be PTV 46. Chart 3 should

7 be PTV 47. I guess we should add Chart 4, PTV 48.

8 Chart 5 should be PTV 49.

9 ARBITRATOR WERTHEIM: Are you sure you

10 don't want to use 5' instead of 5?

11 MR. HESTER: That's fine. And I think the

12 record is clear enough if we omit Chart 5 entirely.

13 ARBITRATOR WERTHEIM: I think that the

14 witness himself said Chart 5 is a mistake and it would

15 only confuse the record by including it.

16 MR. HESTER: Okay. We'll make Chart 5'

17 PTV 49. I would propose not to mark Chart 6 because

18 I don't really think we used it. The witness started

19 drawing it, and he stopped. Chart 7 would be PTV 50,

20 which is where I propose to stop.

21 CHAIRPERSON JIGANTI: All right.

22 (Whereupon, the aforementioned

23 documents were marked for

24 identification as PTV Exhibits

25 Numbers 45 through 50,

1   respectively.)

2   MR. HESTER: And I would move for the

3   admission of those exhibits. We will undertake to get

4   8 and a half by 11 copies of them.

5   CHAIRPERSON JIGANTI: Any objection to the

6   admission of those exhibits?

7   ARBITRATOR WERTHEIM: Are you moving

8   Exhibit 44 also?

9   MR. HESTER: Yes. I'm sorry, Your Honor.

10 Exactly right. And I would also move for the

11 admission of PTV Exhibit 44.

12   CHAIRPERSON JIGANTI: Any objections?

13   (No response.)

14   CHAIRPERSON JIGANTI: They will be

15 admitted.

16   (Whereupon, the aforementioned

17   documents, having previously

18   been marked for identification

19   as PTV Exhibits Numbers 44

20   through 50, respectively, were

21   received in evidence.)

22   CHAIRPERSON JIGANTI: Is there any

23 recross-examination?

24   (No response.)

25   CHAIRPERSON JIGANTI: No recross? Dr.

1   Fairley, thank you very much.

2   THE WITNESS: Thank you.

3   (Whereupon, the witness was excused.)

4   CHAIRPERSON JIGANTI: Monday morning at

5   9:30.

6   (Whereupon, the foregoing matter was

7   recessed at 4:56 p.m., to be reconvened

8   on Monday, January 22, 1996 at 9:30 a.m.)

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BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,              ||
                                   ||   Docket No.
1991 AND 1992                      ||   94-3-CARP-CD90-92
                                   ||
CABLE ROYALTY FUNDS                ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Tuesday, January 23, 1996

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

5098

BY MR. CAMPANELLI:

Q   Let's go back to we were talking about the
situation in the cable market place, and let's turn to
the Bortz and Company survey.

It is your testimony on page 3 that the
Bortz and Company survey is the best measure of market
place value in these proceedings.

Why are you saying that?

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5099

A   Well, the reason I said that is because it is my opinion that if you want to determine the value that a cable system places on different kinds of programming, you should ask them that.

That is what the Bortz survey has done. The criterion variable, which was asked, speaks directly to this issue.

Q   Where was that asked? What, specifically, are you talking about?

A   I think it is question 4, in the 3 years we are looking at here, 1990, 1991, and 1992.

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20   Q   Why is it that you think that that is

21   asking the correct question? Would you go over that

22   with us?

23   A   We are asking the decision makers at cable

24   systems to say, "Look, in terms of attracting and

25   retaining subscribers, how would you allocate your

Q   All right, let me just hand you a copy of that -- the document which was submitted in the 1989 case here.   And I'll direct your attention to page four, which is a summary -- or a portion of the summary of the report.   And let me just ask you to read into the record the first paragraph there.   I'll have some questions for you on it.

A   May I just take a moment here?

Q   Sure.

A   I wanted to read the previous --

Q   Please, read as much of it as you wish.

A   I'll read this paragraph and then -- "In marketing and other research, the constant sum is frequently utilized as a means of determining how surveyed respondents are likely to act in a choice situation.   In any instance where self reported measures are used to collect information, one cannot be absolutely certain that such information is predictive of actual behavior."

"Nevertheless, those engaged in market research have traditionally relied upon constant sum measures as an accurate gauge of behavioral intentions.   Furthermore, the studies that exist demonstrate that the constant sum technique provides a reliable and useful indicator of actual behavior."

Q   Okay. Would you agree with those --

A   Yes, I would agree with those.

BEFORE THE

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DISTRIBUTION OF 1990,

1991 AND 1992

CABLE ROYALTY FUNDS

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Docket No.
94-3-CARP-CD90-92

Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Thursday, January 25, 1996

The above-entitled matter came on for hearing, pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

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9   Q   Let me set the stage again, for the Panel.

10   You gave us, this morning, of what you think the

11   proper marketplace value is, in this case.

12   A   Yes.

13   Q   And could you jus give that to us, briefly

14   again?

15   A   Yes.   It's the prices that would have

16   induced the cable operators to carry the programming

17   that they actually carried.

18   Q   And is it your opinion that the Bortz

19   study obtained that value?

20   A   It's my opinion that the Bortz study was

21   the best way to ask the question in an understandable

22   way, in order to obtain that value.

23   Q   And you were asked a series of questions,

24   toward   the   end   of   the   morning,   of,   about   a

25   hypothetical free market?

1   A   Yes.

2   Q   And does that affect your opinion about

3 whether the Bortz study asked the right questions?

4   A   No.

5   Q   Why is that?

6   A   Well, first of all, let me clarify what I

7 understood by the hypothetical free market. What I

8 understood by the hypothetical free market would be a

9 market in which cable operators contracted directly

10 with program suppliers.

11   To purchase the programming that they,

12 that they are currently carrying as distant broadcast

13 signals.

14   And, if you had such a market, then you

15 would end up with a, you would likely end up with a

16 completely different set of programming on, being

17 carried, compared to what actually was carried.

18   So I don't think, I don't think that it's,

19 that that would be useful for this proceeding.

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ARBITRATOR WERTHEIM: Now we've had several different versions of our simulated free market and there's probably more to come. Are we obliged in any way to pick any one of them?

THE WITNESS: Well, are you obliged? I feel uncomfortable telling you what your obligations are. What I've tried to do in my testimony is to take this term marketplace value and -- which is a term that's loosely thrown around in everyday language and -- but which people loosely throwing it around, has a very loose meaning, and to try to give it a meaning that has -- that can be justified within real economic analysis.

And so I can think of two possibilities that I think would help solve the problem of the panel as I understand it. And so one would be to hypothesize this market in which the bundle was

1   unbundled -- it was completely unbundled so that the

2   programs were sold separately.

3   And the other would be to contemplate a

4   market in which the signals were only slightly

5   unbundled, which would mean that the various classes

6   would be sold themselves as bundles. Those are both

7   marketplaces that I can -- where I understand what

8   they mean. And I understand what marketplace value

9   means.

10   Now, the Bortz survey -- well, comparing

11   those two, there's probably -- there probably is a

12   difference between the values you would get, but it's

13   not at all obvious to me in which direction it would

14   go because I don't know whether sports gets more under

15   the bundling or less under the bundling.

16   The Bortz survey is asking for the share.

17   And it's reasonable to ask whether when the

18   respondents were answering the questions whether they

19   contemplated the first of the marketplaces I talked

20   about or the second of the marketplaces I talked

21   about. And you know, I guess I think it's of course

22   sheer speculation on my part what they really

23   understood, but it makes -- I think they probably were

24   thinking about the second of these.

25   They were thinking about the -- they were

1 answering what would happen if these were sold as

2 bundles. And if you decide that that's the relevant

3 marketplace, then you're done because it's answering

4 exactly the right question. If you decide that no, we

5 really want this marketplace where all the programs

6 are sold separately -- they're not sold as category

7 bundles, then you have to say well, if I think the

8 Bortz people were answering this other market, then

9 it's not exactly what I want.

10 But I would argue that it's still getting

11 very close to what you want because first of all, it's

12 not obvious which -- you know, it's not obvious which

13 way this goes. There's no systematic bias that I can

14 see in getting these total values instead of the

15 marginal values.

16 So in some sense, it's still an unbiased

17 estimate of what it is you really want. This point

18 about -- and I'll just repeat all the answers that I

19 made this morning when we were talking about the

20 distinction between marginal value and average value.

21 That you have to view this programming in the context

22 of all the other programming that's available to cable

23 operators.

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BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,
                                    Docket No.
1991 AND 1992                       94-3-CARP-CD90-92

CABLE ROYALTY FUNDS

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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Thursday, February 1, 1996

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

1   Q   I was wondering if you could tell me --

2   start from the very beginning, when you were

3   approached to do this survey.

4   A   In 1991, I want to say it was probably

5   May, but it was certainly in the late spring, my

6   colleague and friend, Dr. Ford, gave me a call and

7   asked me if I wanted to participate in the development

8   and execution of a study for the Canadian Claimants.

9   I said, "Sure," not knowing what I was getting into,

10   and went down to visit with the counsel and had -- and

11   I believe that at that same meeting there were

12   representatives of the Canadian Claimants present.

13   Q   What did they ask you to do?

14   A   They asked us to collect evidence that

15   would be informative in the Copyright Royalty

16   Tribunal's task of allocating royalties on the basis

17   of value of programming. And I don't remember the --

18   Q   Sure.

19   A   -- it was quite a long time ago. I don't

20   remember the discussions, but I think it's quite fair

21   to say that the purpose of the study, as you saw it

22   reported here, was consonant with the way we

1   understood needs of both the Tribunal and the Canadian

2   Claimants.

3   Q   Up to the point when you were first

4   approached, had you heard of the Bortz cable operator

5   study?

6   A   No, sir.

7   Q   Who suggested doing a constant sum survey?

8   A   Well, I think that after we had talked

9   about the task ahead of us, it was apparent to both

10   Dr. Ford and myself that a constant sum scale was

11   really quite the obvious choice.   As I mentioned in

12   previous testimony today, there are a number of

13   different alternatives.   But the fit between this

14   problem and that application is really quite apparent.

15   And I don't remember there being a great

16   deal of debate or discussion about whether this was a

17   right one or not the right one.   It was here is the

18   problem; here is the approach.   And people felt very

19   comfortable with that then as we do now.

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BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,

1991 AND 1992

CABLE ROYALTY FUNDS

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Docket No.
94-3-CARP-CD90-92

Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Tuesday, March 19, 1996

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

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10   Q   Let me try to be more specific, then. The

11   Bortz survey in each of these years asks the cable

12   operators how at a given point in time they valued

13   programming that they had carried during the year;

14   correct?

15   A   Right, correct.

16   Q   And I gather from what you were saying

17   earlier that if those respondents actually had to go

18   out and buy the different categories of programming at

19   some future date, that their behavior might be

20   different from the responses that they gave?

21   A   It might in individual instances. In the

22   aggregate, I would think that the behavior would very

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BEFORE THE

COPYRIGHT ARBITRATION ROYALTY PANEL

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DISTRIBUTION OF 1990,          ||
                               ||    Docket No.
1991 AND 1992                  ||    94-3-CARP-CD90-92
                               ||
CABLE ROYALTY FUNDS            ||
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Hearing Room 414, Fourth Floor
Madison Building
Library of Congress
101 Independence Avenue, S.E.
Washington D.C.

Tuesday, March 19, 1996

The above-entitled matter came on for hearing,
pursuant to notice, at 9:30 a.m.

BEFORE:

THE HONORABLE MEL R. JIGANTI, Chairperson

THE HONORABLE JOHN B. FARMAKIDES

THE HONORABLE RONALD WERTHEIM

1   Q   Okay.   And if we're looking in this

2   analogous cable marketplace, let's call it that, the

3   analogous cable marketplace, is what you're saying is

4   that the Bortz studies would tell us what the relative

5   shares of the different program types would get in

6   that analogous marketplace?

7   A   In aggregate.

8   Q   In aggregate, for the program categories.

9   A   It's a measure of -- on a percentage

10   basis, of approximately what the percentage on an

11   aggregate basis of -- in the analogous -- in the

12   unconstrained market. If you look at what the total

13   payments that went from cable systems to cable

14   networks to distant signals in an unconstrained

15   market, then what the Bortz analysis tells us is an

16   estimate of portions -- portions of that -- of the

17   amount of that that would go between distant signals

18   and program owners.

19   Q   So you're saying that if we had

20   negotiations between distant signals and program

21   owners in this market that we would expect, in

22   aggregate, that the result would be very similar to

1   the Bortz numbers. Is that fair?

2   A   Yes.   Well, I'm saying that the Bortz

3   numbers are the only empirical estimate in the record

4   that I know of -- of all of these things. That it's

5   -- that it's a survey that asked the cable system a

6   question which they would be able to answer and which

7   -- on the basis of which they would normally make this

8   sort of decisions.

9   So, yes, I'd say that that -- that, plus

10   the qualitative evidence in the record, would lead to

11   a conclusion, yes, of how to divide up, as to what

12   division of program owner revenues by program category

13   on percentage terms would get in the unconstrained

14   market.
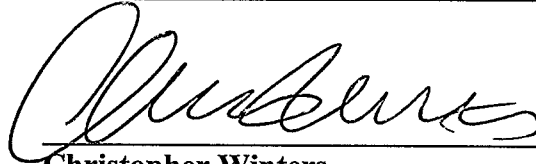
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CERTIFICATE OF SERVICE
Docket No. 2001-8 CARP CD 98-99

I hereby certify that copies of the foregoing Joint Sports Claimants' Designation of Testimony and exhibit lists were sent on July 25, 2003, by hand delivery and overnight mail, to the following parties:

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